Alternatives Development and Evaluation

Prepared for:

Alaska Department of Transportation & Public Facilities

and

Municipality of Anchorage

Prepared by:

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List of Acronyms and Terms

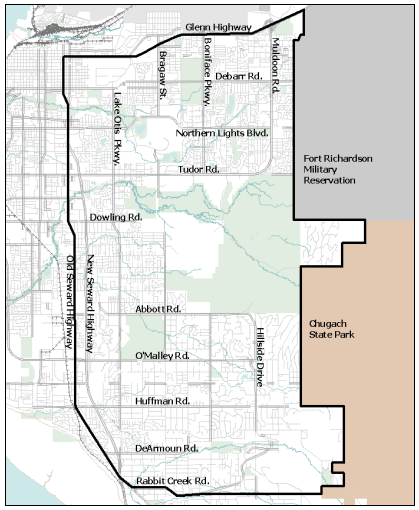
ADT	Average daily traffic
AMATS	Anchorage Metropolitan Area Transportation Solutions
APU	Alaska Pacific University
ATIS	Advanced Transit Information Systems
CBD	Central Business District
DU	Dwelling Units
HOV	High Occupancy Vehicle
ISER	Institute of Social and Economic Research
LRTP	Long Range Transportation Plan
MPH	Miles per hour
UAA	University of Alaska Anchorage
VHT	Vehicle hours traveled
VMT	Vehicle miles traveled

Arterial	A road that is designed to move large volumes of traffic and goods, generally from one part of the community to another to connect major employment and activity centers to large residential areas.
Bus transit "queue-jumper" lane	Lanes dedicated to buses to allow buses first priority through the intersection when the light changes.
By-pass	A road designed to go around existing development. It could be classified as a freeway or expressway.
Collector	A road designated to carry traffic between local streets and arterials, or from local street to local street.
Dwelling unit	A building, or portion of a building, that contains separate living facilities.
Express bus	Bus transit service with a limited number of stops, either from a collector area directly to a specific destination or in a particular corridor with stops en route to major transfer points or activity centers.
Expressway	A road with full or partial control of access with limited access via at-grade or grade-separated intersections whose function is to carry through-traffic at somewhat slower speeds than a freeway.
Feeder bus	Local bus transit service that provides passengers with connections to main-line arterial service, an express bus service station, or an express bus stop or terminal.
Freeway	A limited access, high-speed road with grade-separated interchanges whose function is to carry traffic.
Limited stop bus	Bus transit service that serves only specific stops with the intent of serving important destinations such as major employment centers efficiently.
Local street	A road designed to provide access to adjacent properties.
Wetland Classification: A, B, and C	The Anchorage Wetland Management Plan (MOA, 1996) designates freshwater wetlands based on values and functions. These designations are based on a hierarchical value system, with "A" wetlands representing the most important sites, "B" wetlands being of moderate to high values, and "C" sites representing the lower value areas. The "A," "B," and "C" designations are often termed Preservation Wetlands, Conservation Wetlands, and Developable Wetlands, respectively.

Introduction

The objective of the East Anchorage Study of Transportation . . .

Find long-range solutions to travel mobility within and through the study area.



East Anchorage Study Area

The focus of this report . . .

To present alternative solutions for solving current and forecast transportation problems in greater East Anchorage for transportation modeling and analysis. To present technical findings from modeling and analysis.

Study Overview

State and local officials commissioned the East Anchorage Study of Transportation (EAST) to examine transportation improvements for the East Anchorage study area.[1] The study's objective was to identify current problems; forecast future transportation demands and deficiencies (through the year 2023); and then analyze approaches to improve our ability to travel safely and efficiently within and through the study area. The study focused on accessibility, mobility, and public safety, as well as relieving congestion at major eastside intersections. The end product will provide data and analysis to help plan future public transportation, sidewalk, trail, and road improvements. Findings from EAST will be used, in part, to prepare Anchorage's long-range transportation plan (LRTP).

EAST has been organized into four study phases, as noted below.

1. Transportation and Mobility Data Gathering and Analysis
2. Problem Identification and Study
3. Alternative Development and Evaluation (contained in this document)
4. Study Recommendations

This report continues documentation on the third phase of work, "Alternative Development and Evaluation." The first step in this phase was to establish criteria to be used to assess and refine alternatives. These criteria are published in a separate report. The second step was to develop potential solutions to address transportation needs and evaluate their effectiveness. Based on public input, common ideas emerged for solving current and future transportation problems. These ideas were combined into alternative solution themes that form a framework for analysis. An analysis of these solution ideas within this framework is intended to generate important data needed to answer some of Anchorage's long-standing transportation questions. This report summarizes the solution themes, assesses the elements of each solution theme according to how well they serve travel needs, and presents information on associated tradeoffs. The final step will be to develop recommendations based on the results of the analysis. Recommendations will reflect combinations of elements from the different themes depending on the analysis.

Report Overview

The key objectives of this report are to:

- Present the potential solutions for solving current and forecast (through 2023) transportation problems in greater East Anchorage.
- Present analysis and findings on the evaluation of those solutions.

[1] Defined as the geographic area bounded by the Glenn Highway to the north, Rabbit Creek Road to the south, the Old Seward Highway to the west, and the Ft. Richardson Military Reservation and Chugach State Park to the east.

Solution Theme Overview

Over the summer and fall of 2002, the study team heard many ideas for solving current and future transportation problems in the greater East Anchorage area—from adding more lanes to existing roads, to constructing expressways across town, to exploring the extent to which land-use changes and transit and pedestrian improvements could make traveling in Anchorage better now and in the future. In response to these ideas, five alternative solution themes were developed as a framework to test various ideas. Much like doing an experiment, the solution themes hold various elements constant to test the relative effectiveness of the elements that are varied. The overview below provides a summary of the general categories of ideas heard, the solution themes developed in response to those ideas, and each solutions theme's main elements.

General Ideas Heard	EAST Solution Theme	Solution Theme Components
Make road improvements that are already approved, implement land-use changes articulated in the comprehensive plan, and make planned public transportation improvements.	**Base Case**	**Road:** Road improvements that have been approved through the environmental and permitting process. **Transit:** People Mover Route Restructuring Plan routes and Anchorage 2020 frequency goals. **Land-Use**: Anchorage 2020 comprehensive plan land use goals and policies. **Pedestrian/Bike:** Anchorage 2020 envisioned pedestrian network.
Implement all planned improvements approved in existing plans like the comprehensive plan and long-range transportation plan.	**Implement Long-Range Transportation Plan**	**Road:** Long Range Transportation Plan and Major Investment Study projects. Specifically test Bragaw Street extension and Boniface Parkway and Dowling Road connections. **Transit:** Same as Base Case. **Land-Use:** Same as Base Case. **Pedestrian/Bike:** Base Case and Anchorage Trails Plan connections.
Make new connections where they are missing to provide alternative travel routes for driving, walking, and transit.	**Complete the Network**	**Road:** Complete missing pieces of arterial and collector roads. **Transit:** Base Case plus new bus routes on new roads. **Land-Use**: Same as Base Case. **Pedestrian/Bike:** Same as Base Case plus complete missing sidewalk connections along arterial and collector roads.
Add more lanes to existing roads for car, bus, and bike use.	**Widen What We Have**	**Road:** Widen arterial and collector roads to sufficient capacity. **Transit:** Base Case plus widened locations for high-occupancy vehicle (HOV) lanes or transit lanes. **Land-Use:** Same as Base Case. **Pedestrian/Bike:** Base Case plus new or separated routes along wider roads.
Implement innovative land use, pedestrian, and transit scenarios within the framework of Anchorage 2020.	**Provide Land-Use and Transit Choices**	**Road:** Same as Base Case. **Transit:** Same as Base Case plus innovative transit strategies and additional routes. **Land-Use:** Same as Base Case plus housing and employment density shifts beyond base conditions. **Pedestrian/Bike:** Base Case plus sidewalks on all streets in the urban area of Anchorage.
Create cross-town connections to focus more travel on fewer but more-efficient through-town routes.	**Provide Major Cross-Town Connections**	**Road:** Freeways, expressways, and/or bypasses with a limited number of intersecting roads or driveways. **Transit:** Base Case plus new express bus routes and limited-stop bus routes on new roads. **Land-Use:** Same as Base Case **Pedestrian/Bike:** Base Case plus new routes along roads and new connections.

Solution Theme: Base Case

Base Case Solution Theme: *The Base Case reflects road projects already approved through the environmental phase of project development. All solution themes assume these improvements as a base and build upon them.*

Major Components:

- *Environmentally approved road projects*
- *Anchorage 2020 transit, land-use, and pedestrian commitments.*
- *People Mover Route Restructuring routes.*

EAST and Anchorage 2020

The Anchorage 2020 Comprehensive Plan forms a base upon which all other assumptions are built. As such, all land use, transit, and pedestrian environments articulated in the plan have been input into the MOA's Anchorage Transportation Model. To that extent, the Base Case Solution Theme represents a scenario that tests what would happen if we built no additional roads but relied solely on the land use, transit, and pedestrian changes envisioned by the plan.

EAST's primary goal is to provide data and analysis to decision-makers. That means EAST must not only identify solutions but also provide information to answer some of Anchorage's long-standing transportation questions. The most basic of these questions is this: What would transportation in 2023 look like if the future involved only those road projects that have environmental clearance? The Base Case Solution Theme was structured to test a transportation scenario that includes only road projects that are through the environmental process (see below for examples) and implements the policy commitments articulated in the Anchorage 2020 Comprehensive Plan (MOA 2001) and the People Mover Route Restructuring plan (2002). (Two recently adopted documents; see the next pages for details on these plans.) Moreover, the base case represents the underpinnings of all the other alternatives. That is, this theme forms the base upon which all other potential solutions are built. It is used as the control against which all other solutions are compared.

The following list highlights components of this theme, and the following pages discuss these components in more detail.

Base Case Solution Theme Components

- **Road:** Only road projects that have environmental clearance would be constructed. Road projects considered part of this solution theme include constructing Dowling Road from the Old Seward Highway to Lake Otis Parkway with five lanes and extending C Street from Dimond Boulevard to O'Malley Road as a four-lane facility.

- **Transit:** All Anchorage 2020 Comprehensive Plan transit policies (15 minute frequencies, transit centers, etc.) and the People Mover's planned route restructuring would be implemented. Planned transit changes are included because the route-restructuring plan is such a recent document.

- **Land-Use**: Land use patterns would continue to evolve to reflect the Anchorage 2020 Comprehensive Plan land-use policies such as town centers, transit-supportive development corridors, employment centers, etc.

- **Pedestrian:** The pedestrian/bike trail and sidewalk systems would continue to improve reflecting the Anchorage 2020 Comprehensive Plan policies and Anchorage Trails Plan connections.

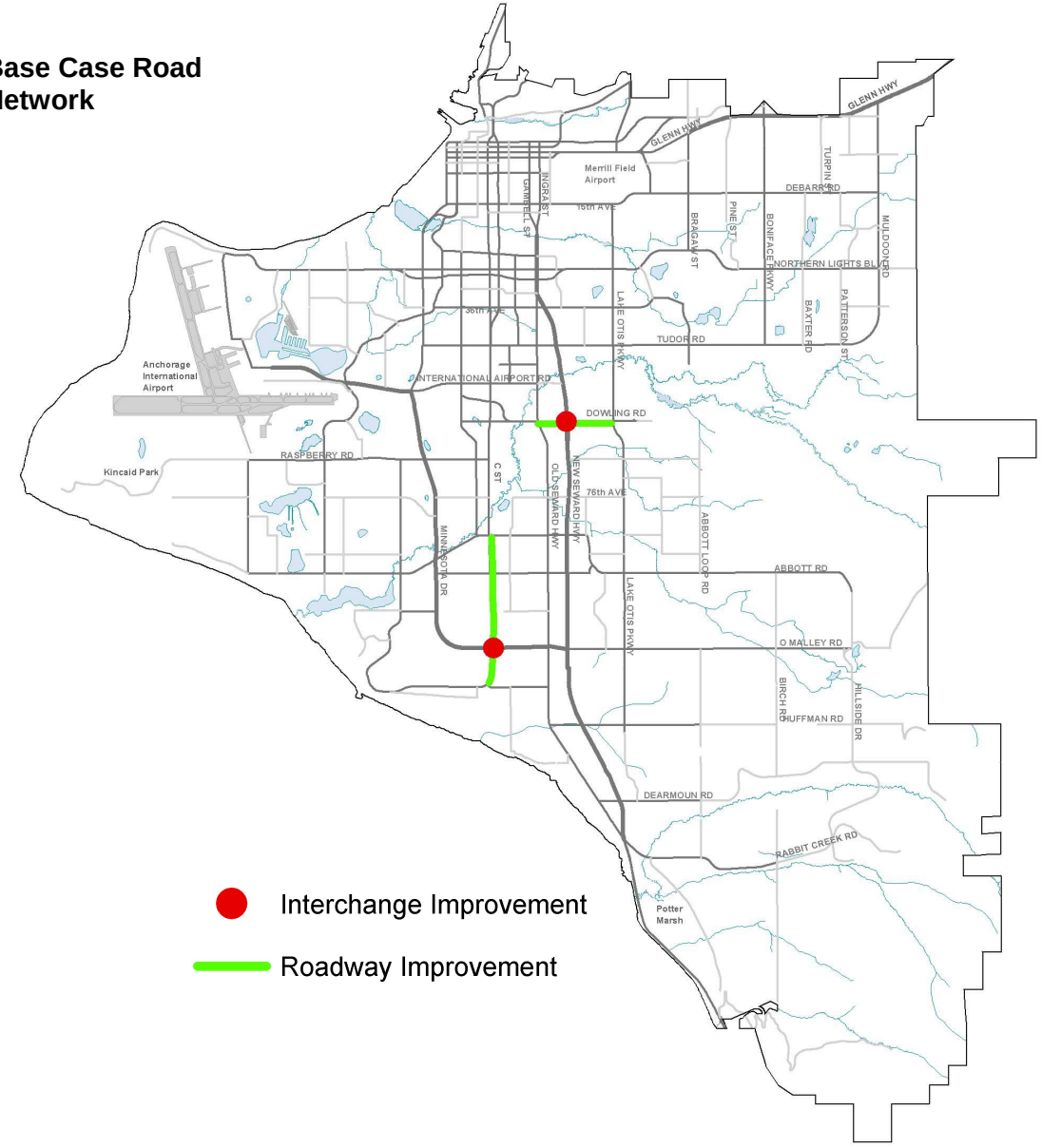
Base Case: Road Component

The adjacent map shows the existing collector and arterial road network with the environmentally approved road network highlighted in green.

In this study, only those projects that are in an approved plan, have dedicated funding, and have been cleared through the environmental and permitting process have been considered part of the base case road network.

Only two projects meet these conditions: the upgrade of Dowling Road to five lanes from Lake Otis Parkway to the Old Seward Highway, including interchange improvements at the New Seward Highway; and the extension of C Street from Dimond Boulevard to O'Malley Road as a four lane facility with a grade-separated interchange at O'Malley. Construction on both of these projects has begun.

Base Case Road Network



Base Case: Transit Component

The following transit elements form the base upon which all other alternatives are built. For more information, each published plan should be consulted directly.

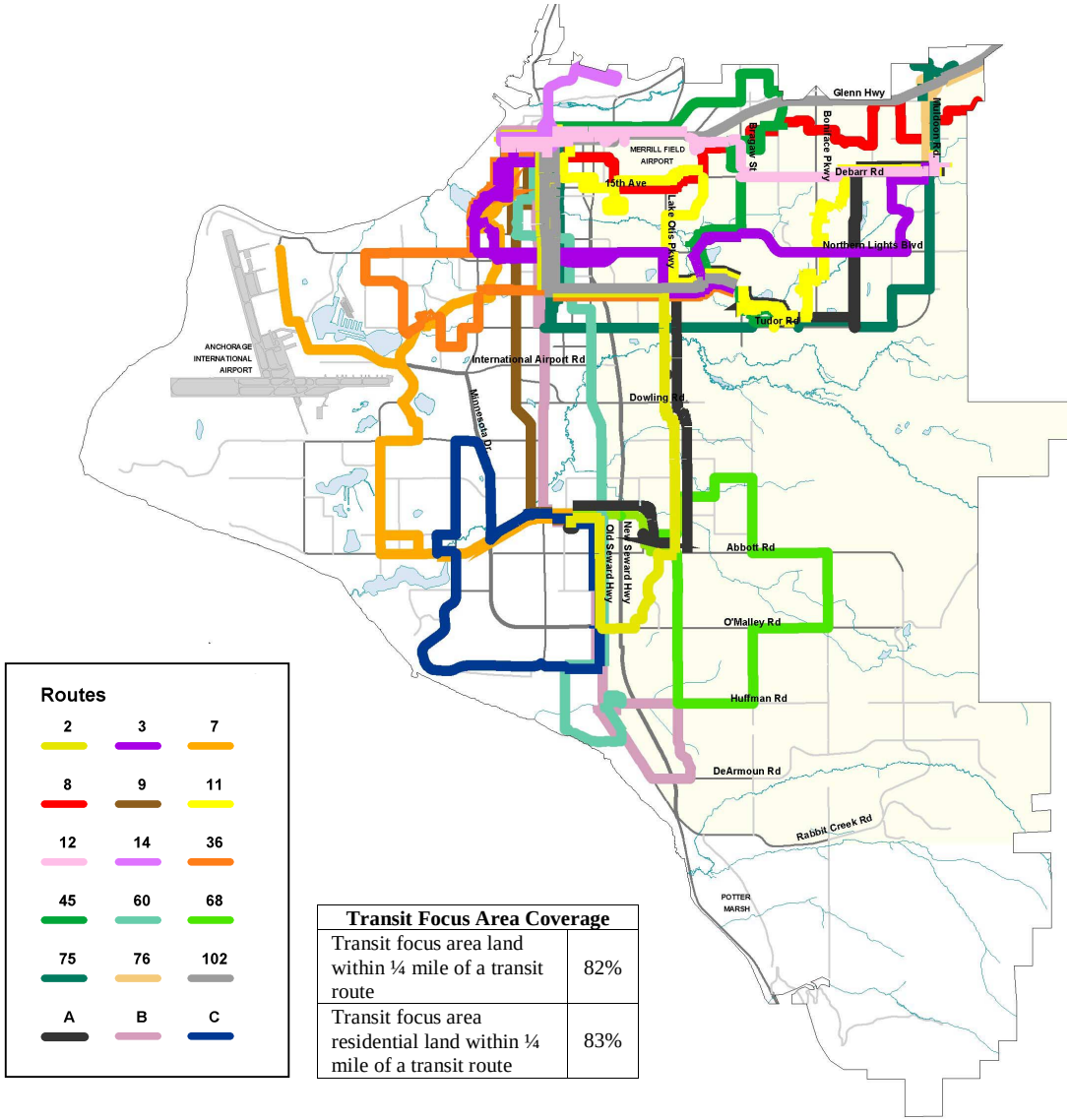
People Mover Route Restructuring Plan. *People Mover has articulated a plan (MOA 2002) to make the following improvements to the transit system:*

- *Operate 30-minute frequencies all day on weekdays on all routes.*
- *Provide a community connector service in the lower-demand, low-density areas.*
- *Operate later on weekdays and earlier and later on weekends.*
- *Include timed transfers to minimize the time passengers have to wait to transfer between routes.*
- *Provide routes that are more direct and some express route options to further reduce travel times.*
- *Add transit hubs in the Muldoon and the University of Alaska Anchorage (UAA)/Providence Hospital areas.*

Anchorage 2020. *Anchorage's comprehensive plan expresses a commitment to the following types of transit and transit supportive improvements:*

- *Better pedestrian-to-transit links.*
- *Improved transit service between residential areas, and employment, educational, and recreational centers.*
- *Transit-supportive development corridors served by 15-minute headways during peak periods and higher density residential development.*

People Mover Route Restructuring Routes



Transit Focus Area Coverage	
Transit focus area land within ¼ mile of a transit route	82%
Transit focus area residential land within ¼ mile of a transit route	83%

Base Case: Land Use Component

The base case land use patterns are assumed to reflect land-use policies promulgated by Anchorage's comprehensive plan (MOA 2001). The accompanying policy map taken from the Anchorage comprehensive plan graphically depicts planned changes to land use policy that have been reflected in the Base Case Solution Theme. Key features are highlighted below. For more detail, please refer to the comprehensive plan itself or to the Land Use Allocation Documentation Report (MOA October 2002) (included as Appendix A to the report titled "Forecast").

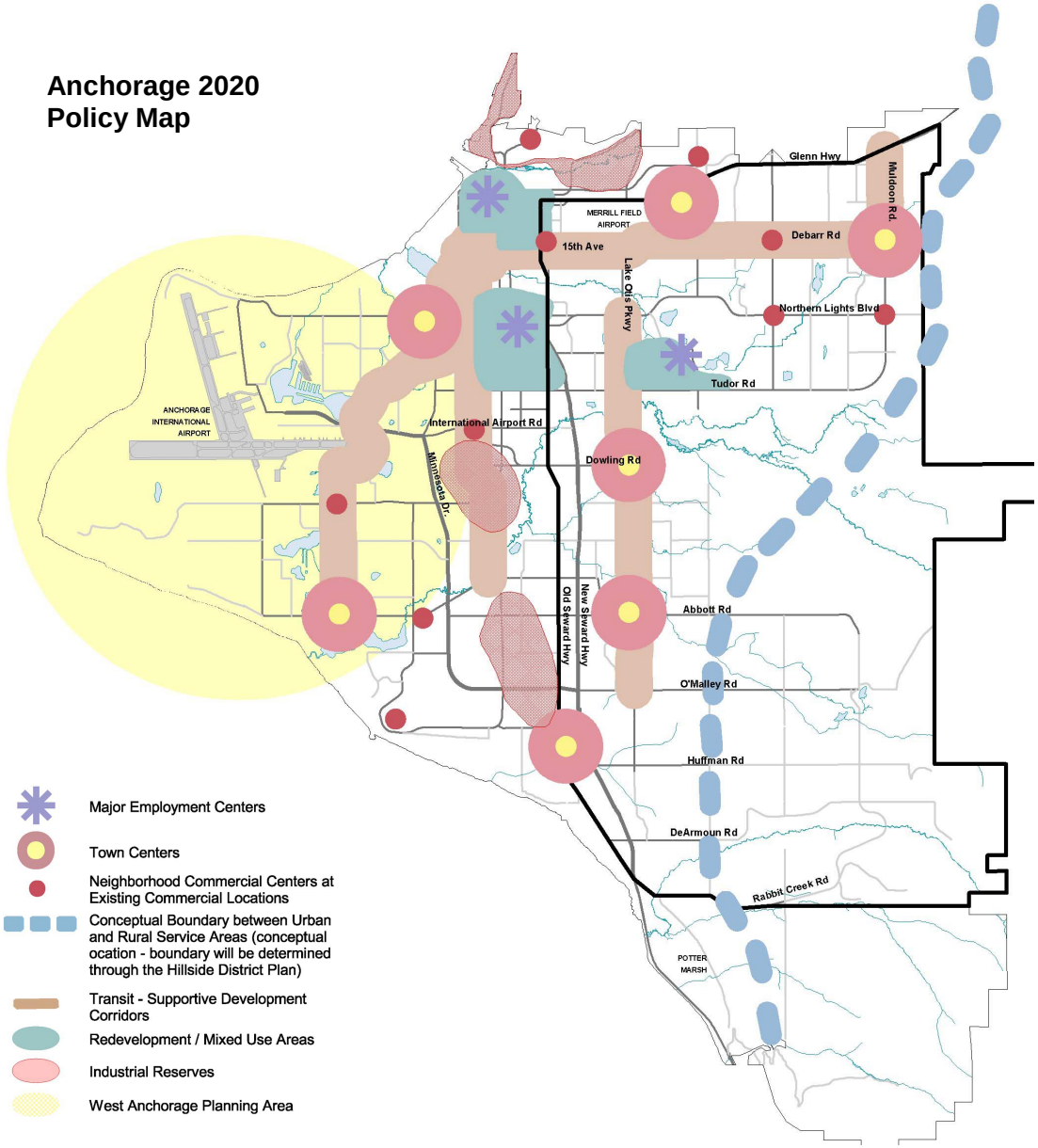
> ***Major Employment Centers***. *This land-use policy will focus future employment into three main areas of the city, increasing employment density and enhancing people's ability to walk or to take public transportation to their work destinations.*

> ***Redevelopment/Mixed Use Areas*** *are areas where redevelopment of underused parcels and infill development of vacant parcels will concentrate on pedestrian-oriented residential and mixed-use development that support and connect to major employment centers.*

> ***Town Centers.*** *Town centers are areas of mixed land uses (residences and businesses in proximity) with higher residential density.*

> ***Transit-Supportive Development Corridors.*** *These areas will facilitate the use of transit by creating pedestrian friendly, higher-density housing areas along certain transportation corridors coupled with increased transit service.*

Anchorage 2020 Policy Map



Base Case: Pedestrian Improvements

As part of the baseline conditions, the pedestrian and bicycle environment called for in the comprehensive plan policies will be implemented. The following describes the specific policies articulated in Anchorage 2020 and assumed as a base for each of the alternatives.

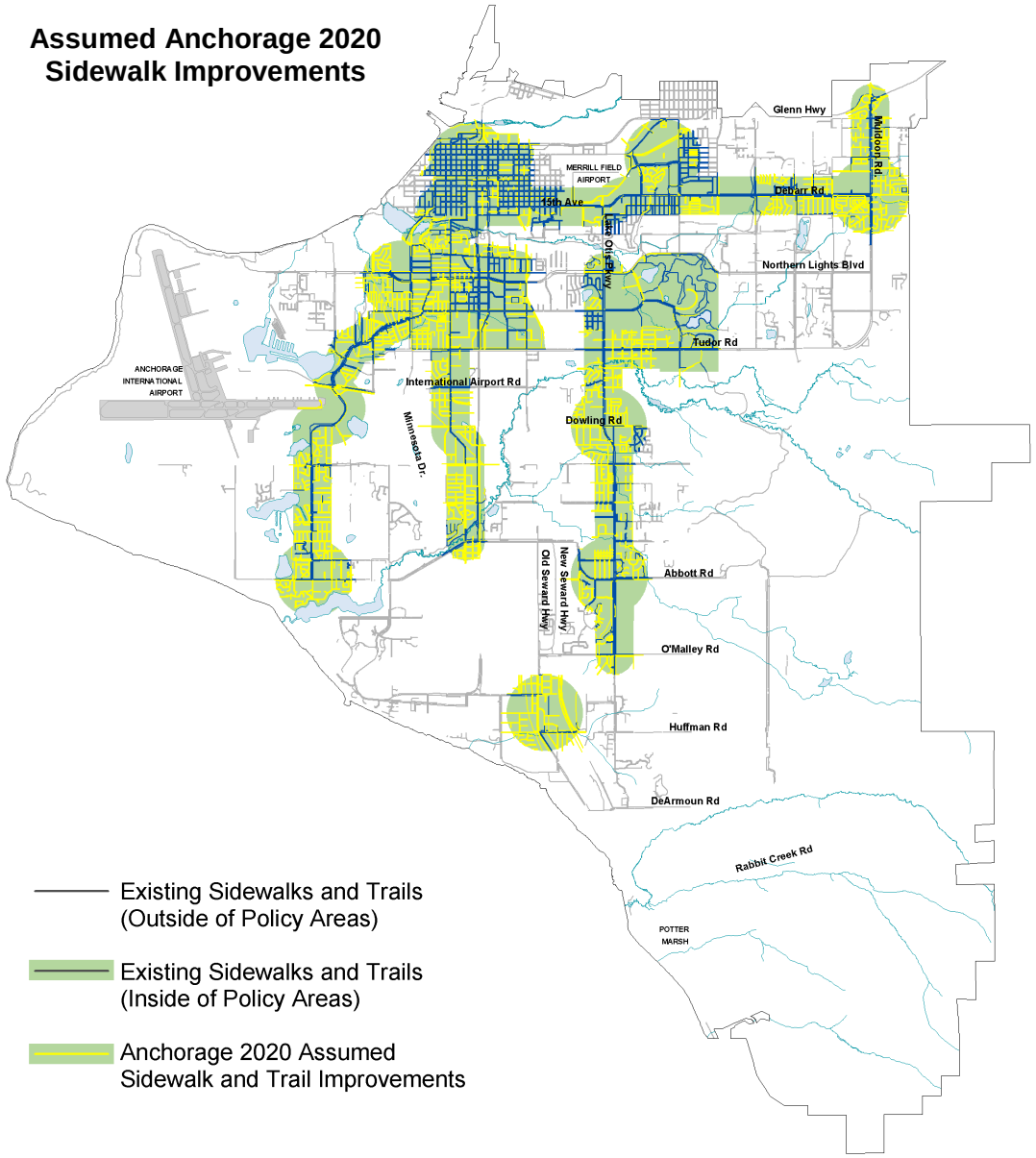
> *Policy 23: Characteristics of employments include "A pedestrian-oriented environment including expanded sidewalks, crosswalks, street furniture, bus shelters, and landscaping" (p. 75).*

> *Policy 24: Town centers include "an enhanced pedestrian environment with good connections within and between the core and surrounding residential development" (P. 76).*

> *Policy 34. Transit supportive development corridors shall be characterized by a "pedestrian-oriented environment . . . including expanded sidewalks, crosswalks, street furniture, bus shelters, and landscaping" (P.79).*

> *Redevelopment areas are described as areas where infill and redevelopment will concentrate on pedestrian-oriented residential and mixed use development . . . Connectivity between redevelopment areas and employment centers will include pedestrian and transit links" (P.52).*

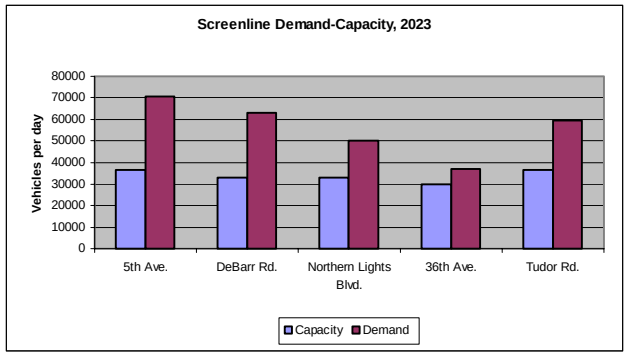
The map to the right depicts the sidewalks assumed to be developed (yellow lines) over the next 20 years within these policy areas as the Anchorage 2020 policies are implemented. These sidewalks are in addition to the existing sidewalk and trail network.



Base Case: Modeling and Analysis

To understand how different transportation improvements influence traffic volume and level of service, traffic models are developed to simulate traffic movements. The transportation model run for the base case was used to compare against other solutions to determine relative effectiveness of each. The transportation model run depicting the base case can be found in Appendix A.

Findings



- Total east-west traffic demand crossing screenline 701 (from Tudor Road north) on an average day is predicted to be 280,000 vehicles in 2023 on roads which currently have a lane capacity of 170,000 vehicles: a capacity shortage of 110,000 vehicles (approximately 14 arterial travel lanes). The chart (above) shows the demand and capacity for each road individually.

- Transit ridership is anticipated to increase by 100% to approximately 20,000 trips per day with the implementation of Anchorage 2020 land use and transit policies.

Analysis Results

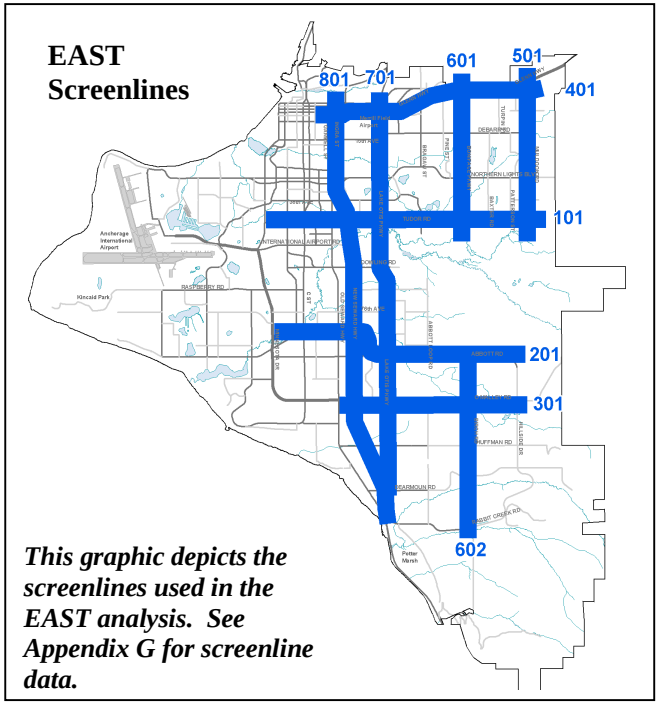
Table 1
Model Statistics

Model Run	Daily VMT (Miles)	Annual VMT (Miles)	Daily VHT (Hours)	Annual VHT (Hours)	Avg. Speed (MPH)	Daily Delay (Hours)	Annual Delay (Hours)
A1	6,779,826	2,474,636,490	197,292	72,011,580	31.6	592.1	216,116.5

Table 2
Evaluation Criteria Summary

Criteria		A1
Residential Parcels Affected	#	NA
	Acres	NA
Industrial Parcels Affected	#	NA
	Acres	NA
Commercial Parcels Affected	#	NA
	Acres	NA
Parkland	Acres	NA
Natural Open Spaces	Acres	NA
Stream Crossings	??	NA
Wetlands	Acres "A"	NA
	Acres "B"	NA
	Acres "C"	NA
Wildlife Habitat	Acres	NA
Nonattainment Area VMT	Daily miles	3,522,192
Carbon Monoxide	Pounds	89,030
Right of way		NA

NA = Not Applicable. Road development is assumed to have already occurred as part of the base case; no other improvements, and hence no other impacts, were calculated.
VMT = Vehicle miles traveled
VHT = Vehicle hours traveled



This graphic depicts the screenlines used in the EAST analysis. See Appendix G for screenline data.

Screenline analysis has been completed for each of the various model runs under each of the themes and compared with the base case. A screenline adds up all of the traffic demand crossing certain lines (see left) to obtain a comparison of overall demand and how demand shifts from road to road for subareas of the study area under each of the transportation model runs. The complete numerical results of the screenlines are found in Appendix G.

Solution Theme: Implement Long-Range Transportation Plan

Implement Long Range Transportation Plan: *This solution theme provides a framework for examining the combined effect of transportation-related policies and projects articulated in adopted state and municipal plans.*

Major Components:

- ***Road:*** *Long Range Transportation Plan and Major Investment Study projects. Specifically test Bragaw Street extension and Boniface Parkway-Dowling Road connections.*
- ***Transit:*** *Same as Base Case.*
- ***Land-Use:*** *Same as Base Case.*
- ***Pedestrian/Bike:*** *Same as Base Case.*

The variable that changes between this theme and the base case is the addition of planned roadway improvements. These projects have been through various public involvement processes, approved by policy makers, and tested for transportation benefits. The exceptions to these planned improvements are the road connections identified with question marks in the current LRTP (Bragaw Street, Boniface Parkway, and Dowling Road connections). These projects – their tradeoffs and benefits—are tested in this theme.

How would our transportation system function if we simply did those things we have said we are going to do in our adopted plans? This solution theme analyzes the results of implementing the policies and projects identified in adopted state and municipal planning documents including the current 2001 Anchorage Long Range Transportation Plan (AMATS 2001), the Glenn Highway Major Investment Study (DOT&PF 2001a), the Seward Highway Major Investment Study (DOT&PF 2001b), Anchorage 2020 (MOA 2001), and the 2002 People Mover route restructuring plan (MOA 2002). The purpose of this solution theme is to evaluate these documents' combined affect on traffic patterns and volumes. The following sections discuss the components of this solution theme in more detail.

Implement Long Range Transportation Plan: Transit Component

As does the Base Case Solution Theme, this solution theme includes all transit improvements articulated by the Anchorage comprehensive plan (such as 15 minute frequencies, transit centers, etc.) and by People Mover (such as the planned route restructure, improved frequencies, etc.). The discussion of transit improvements under the Base Case Solution Theme has more detail on these topics. No additional transit routes or changes are proposed as part of this theme.

Implement Long Range Transportation Plan: Land Use Component

Land use patterns would continue to evolve to reflect the Anchorage comprehensive plan land-use policies and would include town centers, transit-supportive development corridors, employment centers, redevelopment areas, and so on as noted under the Base Case Solution Theme. For more detail, see the land use discussion under that theme, the Anchorage 2020 Comprehensive Plan (MOA 2001), and the Land Use Allocation Documentation Report (MOA October 2002).

Implement Long Range Transportation Plan: Pedestrian Component

As in the Base Case Solution Theme, this theme calls for pedestrian/bike trail and sidewalk improvements as noted in comprehensive plan policies. For more detail, see the discussion of the pedestrian component under the Base Case Solution Theme.

Implement Long Range Transportation Plan: Road Component

This map depicts future road improvements noted in the current LRTP and as refined by the Glenn and Seward Highway Major Investment Studies. Under this solution theme, each of the following roads are included:

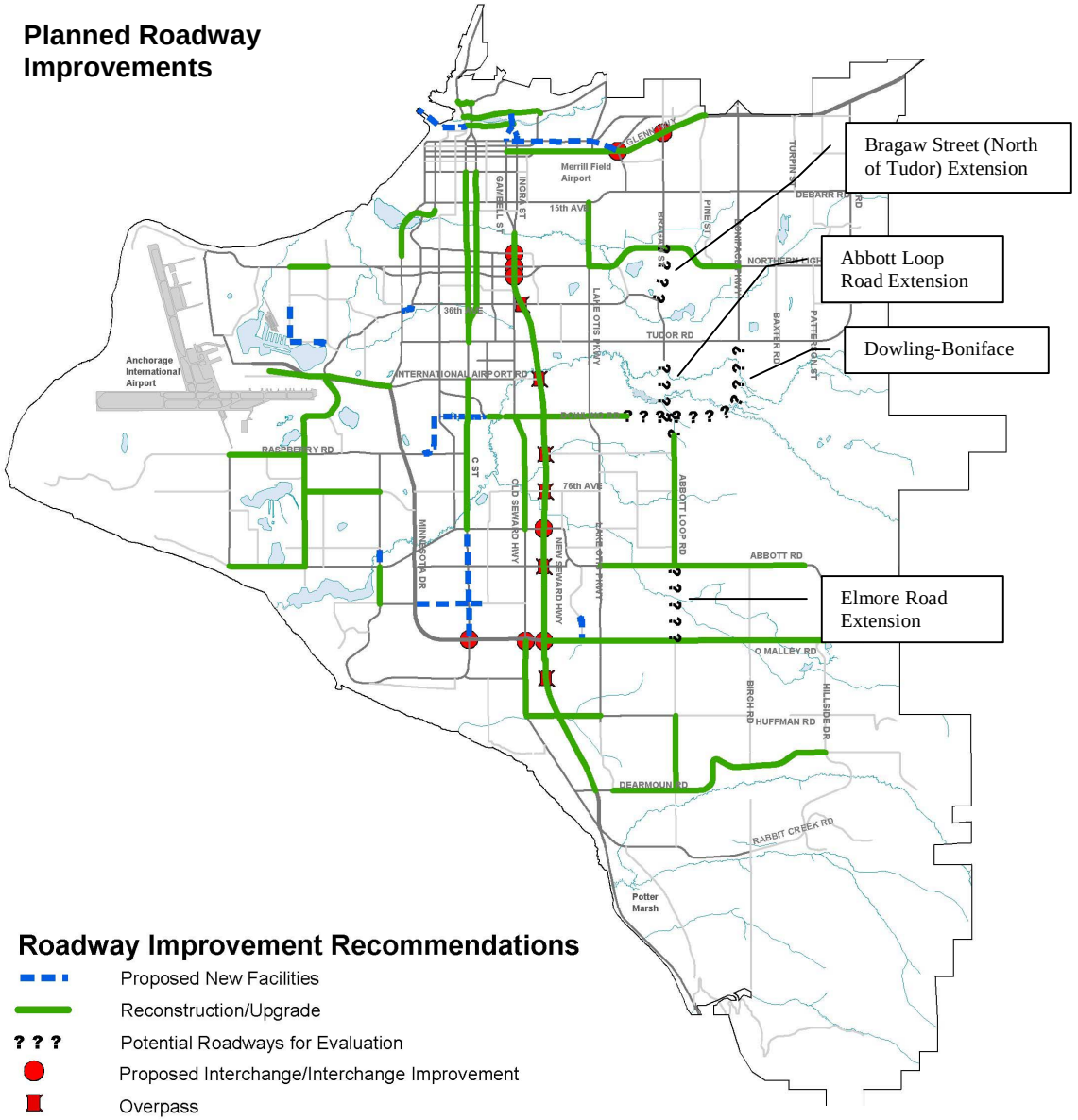
Short Range Recommendations (2001-2006)

- 36th Avenue re-alignment (at Spenard Rd)
- Arctic Blvd (Dimond Blvd to E. 68th)
- C St (International Airport Road to Dimond Blvd)
- C St (Dimond Blvd to Minnesota Drive)
- Dowling Rd (Lake Otis Pkwy to Old Seward Hwy)
- Elmore Rd (Huffman Rd to Dearmoun Rd)
- Independence Dr (Colony Street to O'Malley Rd)
- Northern Lights Blvd (Wisconsin Ave to Aero Ave)
- Old Seward Hwy (Dowling Rd to Dimond Blvd)
- O'Malley Rd (Seward Hwy to Hillside Dr)
- Victor Rd (Dimond Blvd to 100th)

Long Range Projects (2007-2023)

- 5th/6th Ave/Glenn Hwy (McCarrey St to Gambell St)
- 100th Ave (Minnesota Dr to C St)
- A/C Couplet (9th Ave to Tudor Rd)
- Dowling Rd (Raspberry Rd to Lake Otis Pkwy)
- Huffman Rd (Old Seward Hwy to Lake Otis Pkwy)
- Jewel Lake Rd (Dimond Blvd-International Airport Rd)
- Lake Otis Pkwy (15th Ave to Northern Lights Blvd)
- Lakeshore Dr (Wisconsin Ave to Aero Ave)
- Minnesota Dr Northbound (26th Ave to 16th Ave)
- Northern Lights Blvd (Lake Otis Pkwy to Boniface Pkwy)
- Old Seward Hwy (O'Malley Rd to Huffman Rd)
- Raspberry Rd & Dimond (Jewel Lk Rd-Sand Lk Rd)
- Seward Hwy (20th Ave to Rabbit Cr Rd)
- Northwood Dr (88th Ave to Dimond Blvd)

The project specifics can be found on pages 38 to 40 of the LRTP (MOA 2001). Question marks noted on the map reflect connections noted in the LRTP as possible future projects. Different combinations of the planned network with and without these connections are tested under this solution theme.



Implement Long Range Transportation Plan: Modeling and Analysis

Traffic modeling completed under this solution theme tested a number of combinations of "question mark" projects (those noted in the LRTP as "potential roadways"). The following list provides a summary of the road combinations modeled and tested.

B1. LRTP with no question mark roads
B2. LRTP with Abbott Loop Road Extension
B3. LRTP with Abbott Loop Road and Elmore Road Extensions
B4. LRTP with Abbott Loop Road Extension, Elmore Road Extension, and Bragaw Street (University-Medical District) Extension
B5. LRTP with Abbott Loop Road Extension and Dowling Road-Boniface Parkway Connection.
B6. LRTP with Abbott Loop Road Extension, Elmore Road Extension, and Dowling Road-Boniface Parkway Connection.
B7. Full LRTP – All question mark roads with Glenn Highway expanded on 5th Avenue
B8. Full LRTP – All question mark roads with Glenn Highway in a 3rd Avenue-5th Avenue Couplet Configuration.

The tables to the right provide a summary of criteria considered and the results of this planning level evaluation. Graphics depicting the transportation model runs can be found in Appendix B.

Analysis Results

Table 3
Traffic Model Statistics

Model Run	Daily VMT (Miles)	Annual VMT (Miles)	Daily VHT (Hours)	Annual VHT (Hours)	Avg. Speed (MPH)	Daily Delay (Hours)	Annual Delay (Hours)
B1	6,768,927	2,470,658,355	188,912	68,952,880	32.2	465.7	169,962.3
B2	6,763,936	2,468,836,640	188,063	68,642,995	32.3	448.1	163,562.6
B3	6,758,559	2,466,874,035	187,786	68,541,890	32.3	446.5	162,954.3
B4	6,746,162	2,462,349,130	186,031	67,901,315	32.3	420.3	153,391.3
B5	6,753,255	2,464,938,075	184,808	67,454,920	32.4	393.0	143,426.8
B6	6,748,447	2,463,183,155	184,489	67,338,485	32.4	389.3	142,088.4
B7	6,741,045	2,460,481,425	184,259	67,254,535	32.4	388.6	141,820.8
B8	6,743,883	2,461,517,295	186,011	67,894,015	32.4	416.1	151,882.6
Base Case	6,779,826	2,474,636,490	197,292	72,011,580	31.6	592.1	216,116.5

VMT = Vehicle Miles Traveled; VHT = Vehicle Hours Traveled.

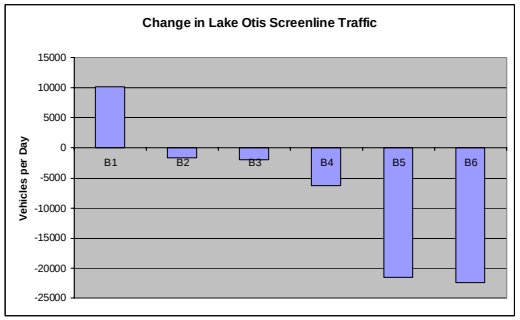
Table 4
Evaluation Criteria Summary

Criteria		B1	B2	B3	B4	B5	B6	B7	B8
Residential Parcels Affected	#	163	167	168	168	184	186	186	181
	Acres	7.7	7.9	8.1	8.1	8.3	8.5	8.5	8.0
Industrial Parcels Affected	#	14	14	14	14	14	14	14	21
	Acres	6.4	6.4	6.4	6.4	6.4	6.4	6.4	7.1
Commercial Parcels Affected	#	131	131	131	132	131	131	132	119
	Acres	8.7	8.7	8.7	9.7	8.7	8.7	9.7	10.4
Parkland	Acres	2.4	5.3	5.6	5.6	13.4	13.7	13.7	11.6
Natural Open Spaces	Acres	27.8	35.1	35.1	42.1	57.0	57.0	63.9	63.9
Stream Crossings	#	33	36	37	37	43	44	44	44
Wetlands	Acres "A"	3.2	10.4	10.9	10.9	10.9	22.5	22.9	22.9
	Acres "B"	2.4	2.4	2.4	6.4	2.5	2.5	6.5	6.5
	Acres "C"	6	6	6.4	7.2	6	6.4	7.2	7.3
Wildlife Habitat	Acres	57.2	64.4	66.5	73.9	86.3	88.14	95.8	95.8
Nonattainment Area VMT	Daily miles	3,528,044	3,511,426	3,504,475	3,493,268	3,453,391	3,446,155	3,440,745	3,450,314
Carbon Monoxide/day	Pounds	84,930	84,458	84,277	83,354	82,819	82,934	82,247	83,265
Right of Way	$ (M)	9.9	10	10	10	10.4	10.4	10.4	10.6

Note: Based on road footprint impacts only.

Findings

This chart shows the predicted change in traffic crossing an east-west screenline just east of Lake Otis Parkway north of Tudor Road (part of screenline #701) with each of the various combinations of traffic model runs that tested the question-marked roads. Completing all of the LRTP projects, except for the question-marked roads (model run B1), actually increases traffic (10,000 average daily traffic, or ADT) predicted to be crossing the screenline.



Combinations with the various segments of Bragaw Street, Abbott Loop Road, and Elmore Road completed (runs B2, B3, and B4) show a slight reduction in anticipated traffic across the screenline; combinations that include Dowling Road connected to Boniface Parkway (runs B5 and B6) show more dramatic reductions (-21,500 to -22,500 ADT). The total change between making none of the question-marked improvements and making them affects the number of vehicles crossing in an east-west direction north of Tudor Road by 30,000 vehicles per day.

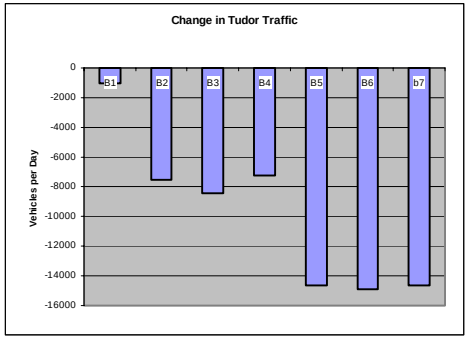
- In each of the runs completed with the various combinations of the LRTP's question mark roads, overall network transportation statistics (VMT, VHT, delay) improve over not completing the connections.

- The connection of Abbott Loop Road to Tudor Road primarily serves Hillside traffic. By itself, this connection does not have a major effect on Lake Otis and Tudor Road traffic. In combination with Boniface Parkway-Dowling Road, it draws considerable traffic and has a positive benefit on Lake Otis Parkway and Tudor Road.

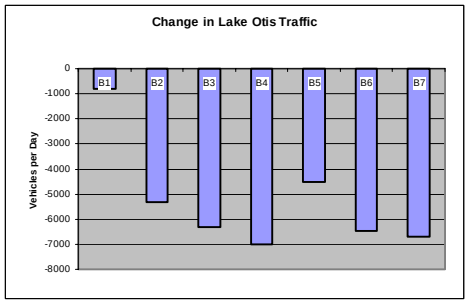
- The addition of Elmore Road extended in combination with Abbott Loop extended (model run B3) represents the traffic flow that would have used lower Hillside roads and Lake Otis Parkway. Traffic diverted from the Hillside to this route heading to the northeast is only one part of the traffic mix using Lake Otis and Tudor. The amount of traffic drawn to the Elmore segment is only about 5,000 average daily traffic (ADT). These road extensions by themselves do not resolve the Lake Otis and Tudor Road traffic problem.

- Extending Bragaw Street, Abbott Loop Road, and Elmore Road (model run B4) continuously north-south through the study area adds to the traffic that would use the corridor, particularly north of the University of Alaska. This is caused by both an increase in Hillside trips using the connection to get to the Glenn Highway, and also through-trips accessing the University-Medical District from the north and northeast. With the full connection, traffic is reduced on Northern Lights Boulevard, Debarr Road, and Lake Otis Parkway. The full length of Bragaw Street (University-Medical District) and Abbott Loop Road extensions show a positive effect on level of service as compared to the base case.

- Transportation model runs that included Boniface Parkway connected to Dowling Road (e.g., model run B5) have a much greater effect on traffic at Lake Otis Parkway and Tudor Road traffic. The analysis suggests that the traffic congestion at Lake Otis Parkway and Tudor Road has a major contribution from cross-town trips moving from northeast to south and southwest, and visa-versa. Likely factors for this are the location of regional shopping at the Dimond Center area, employment that continues to grow to the east of Bragaw Street along Tudor Road, and employment at Elmendorf Air Force Base. The modeling results are supported by the origin-destination work completed as part of the study.



This chart shows the reduction in traffic on Tudor Road east of Lake Otis Parkway with the various alternatives. With the addition of Dowling Road connected to Boniface Parkway (model runs B5, B6, and B7), a marked decrease in traffic on Tudor Road would be anticipated.



This chart shows the reduction in traffic on Lake Otis Parkway south of Tudor Road with the various alternatives. Each of the model runs, with the exception of B1, show a reduction in traffic of between 5,000 and 7,000 vehicles per day on Lake Otis Parkway.

- With connections to Tudor Road made at both Bragaw Street and Boniface Parkway, the traffic is split to two intersections. Spreading this demand between two intersections helps traffic flow and will help the functioning of the intersection on Tudor Road as compared to only having one intersection. Average daily traffic along these segments suggests that more people want to travel between Boniface Pkwy and Dowling Road than between Bragaw and Dowling Road.

- In combination, the question-marked roads would attract and carry considerable traffic. The model run combinations with the question-marked roads, however, had little effect on traffic congestion in the very northwest part of the study area. The overall solution to traffic congestion will not be achieved through construction of any one of the question-marked connections by itself. In combination, they have considerable effect.

- The addition of Elmore Road to any of the modeled combinations has only a small effect on average daily traffic in the corridor. The low population density in this area does not draw a significant number of trips to this road (approximately 5,000 ADT). As part of the mile grid, however, such a connection would have a major benefit for fire fighting, emergency service access, and school busses.

- Runs that tested an expansion of 5th Avenue (model run B7) and a 3rd Avenue-5th Avenue couplet (options currently under consideration along the Glenn Highway) suggest that one additional lane of capacity would be insufficient to accommodate the demand in that corridor. The couplet alternative would draw more traffic and carry more traffic due to its higher capacity.

- The full LRTP run with 5th Avenue expanded (traffic model run B7) resulted in the lowest overall delay in the network, the lowest vehicle miles traveled, and the lowest vehicle hours traveled of any of the LRTP traffic model runs completed.

- Even with all of the question-marked routes included (model runs B7 and B8), traffic demand in excess of capacity is anticipated on nearly all corridors in the north half of the study area, with continued level of service problems. These model runs indicate that the growth and development that have occurred in the last 12 years since these projects were last modeled, coupled with a 2023 forecast for future growth (instead of 2010 when these projects were last studied), have caused traffic levels to grow beyond what these projects alone can accommodate. In short, 12 years ago these projects were forecast to meet 2010 demand; this study indicates that our growth and development by 2023 will cause traffic demand to be greater than what these projects alone can accommodate.

Solution Theme: Complete the Network

Complete the Network

This theme tests the effect of making new road, trail, and transit connections and providing alternate travel routes, thereby distributing traffic over a greater number of routes.

Major Components.

- ***Road:*** *Complete missing pieces of arterial and collector roads.*
- ***Transit:*** *Base Case plus additional new bus routes on new roads.*
- ***Land-Use****: Same as Base Case.*
- ***Pedestrian/Bike:*** *Same as Base Case plus complete missing pieces sidewalk connections along arterial and collector roads.*

This theme holds constant bigger or wider road development. It focuses on completing the missing roads to the same standards as the existing roads on the connecting ends.

This theme tests whether we could solve Anchorage's current and future transportation problems if we were to complete Anchorage's system of roads and pedestrian networks. Generally, Anchorage's collector and arterial road system follows the spacing guidelines identified by the Institute of Transportation Engineers. In areas where the connections are not complete, however, the spacing is, in effect, farther apart than recommended for an urban area. That means a certain number of travelers must detour around the missing or indirect links to complete their trip. Such travel adds to the total vehicle miles traveled and contributes to congestion and air quality problems as our population and corresponding traffic movements grow.

This theme tests whether it is possible to solve our traffic congestion without adding more lanes to our already big arterials and whether with a greater number of smaller connections we can avoid some of the impacts associated with major highways and expressways.

There are a number of benefits of having a more complete grid and this alternative will examine the benefits of completing portions of Anchorage's transportation grid. Completing the network could provide alternative travel routes for transit, walking, and driving. With more routes, cars are distributed to spread the burden of carrying the travel load. Spreading the traffic over a greater number of roads would reduce the traffic growth experienced on some of our existing connections. This means roads may not need to be made wider, which is also more conducive for walking and transit use. With a more complete grid network, transit would be better able to get into residential areas to serve transit riders, on more direct and efficient routes.

The question is this: can a more-complete grid offset the need for road widening in some areas? Can it reduce the need for major, more-costly cross-town connections? What are the tradeoffs and are we willing to live with them as a community? The following sections discuss the components of this solution theme in more detail. Components similar to those in other solution themes are discussed first.

Complete the Network: Land Use Component

Land use patterns would continue to evolve to reflect the comprehensive plan land-use policies such as town centers, transit-supportive development corridors, employment centers, etc. as noted under the Base Case and Implement the Long Range Transportation Plan themes. For more detail, see the discussion under the Base Case Solution Theme.

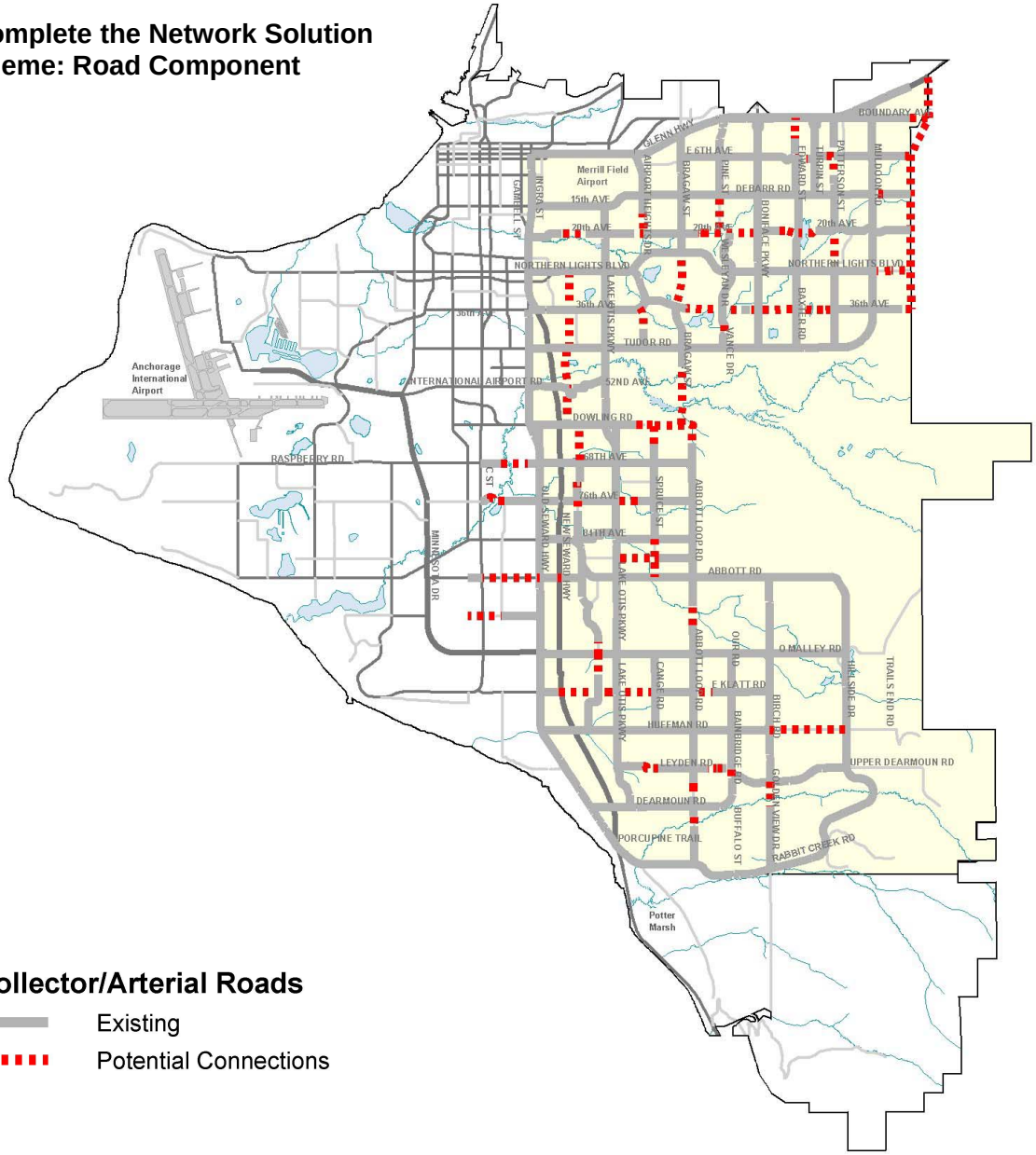
Complete the Network: Road Component

The road component of this solution theme examines constructing shorter connections on arterial and collector roads instead of new, larger roads or additional lanes on existing roads. Completing the collector/arterial grid is examined on the ½-mile grid standard in urban areas and a 1-mile grid in rural areas in strategically identified locations.

Some local roads are re-designated to collector roads where they fall on the ½-mile grid. The local street grid is connected and completed where possible. Road capacities are held constant, testing whether we could reduce the need for additional lanes on existing streets.

As part of the alternatives development process, certain grid connections were selected based on public comment and the 2023 traffic forecasts to distribute some of the traffic and reduce congestion. The pieces were selected based on the existing and forecast roadway congestion, technical feasibility, and to help serve Anchorage 2020 policies of better linking residential areas with employment.

Complete the Network Solution Theme: Road Component

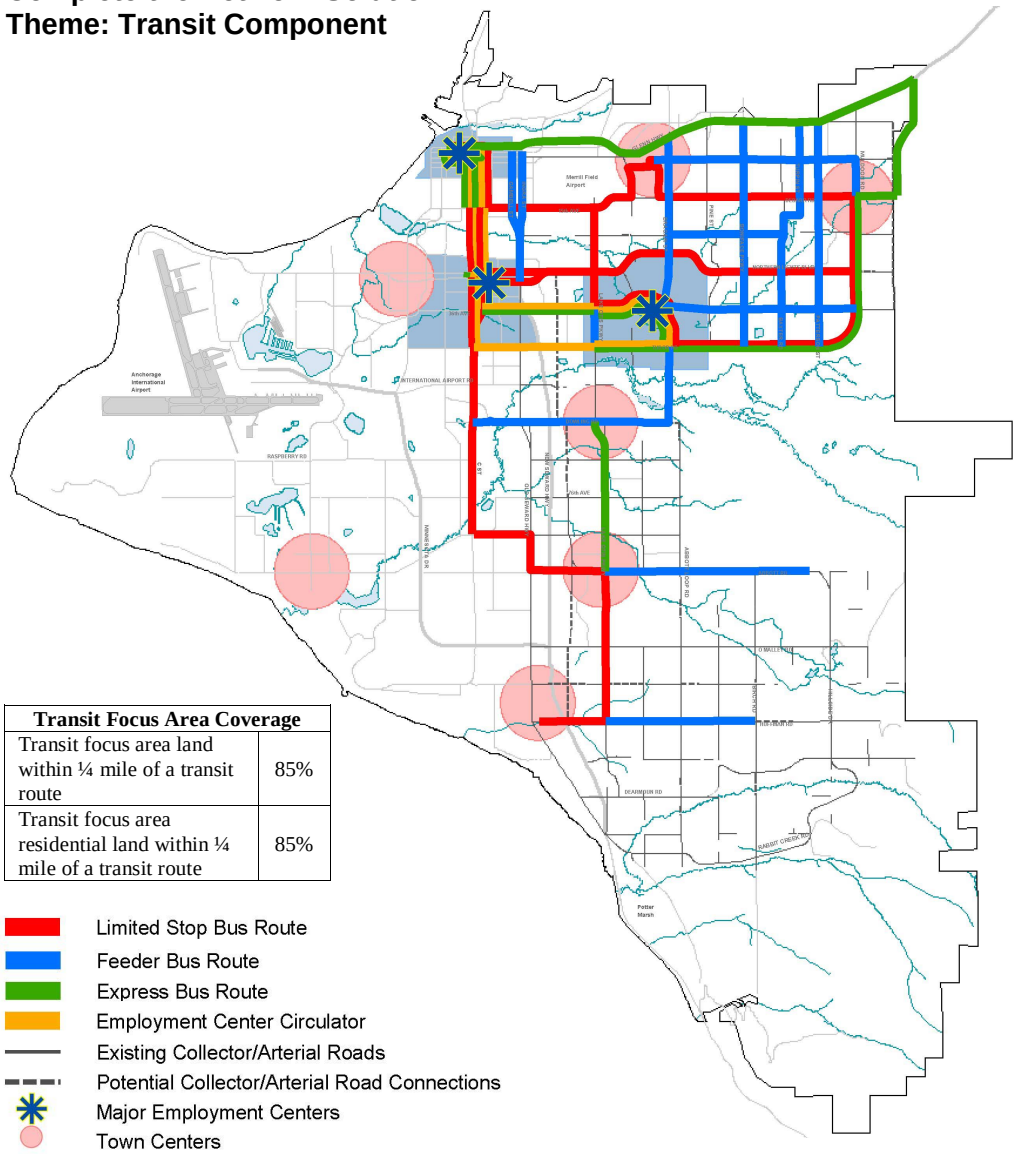


Complete the Network Solution Theme: Transit Component

This theme's transit component builds on the base case, but it goes one step further by creating new bus routes designed to use the new connecting roads. The new routes would provide rapid transit service on key arterial corridors with complimentary local/feeder bus service along the grid network. The local bus service would connect users with the express transit routes, increasing the rider's accessibility to the system. The following list and accompanying map present the recommended transit improvements and connections if a gridded street network were developed:

- Develop express bus route from Eagle River to Muldoon Town Center to UAA via Muldoon/36th or Tudor Road then on to the Midtown then Downtown Transit Centers.
- Add new express bus route from Eagle River to the Downtown Transit Center via Glenn Highway.
- Develop a new limited-stop bus route from the Huffman Town Center to Dimond Boulevard via Lake Otis Parkway and then to UAA and to the Northway Town Center.
- Develop a new, limited-stop bus route linking Muldoon Road to UAA, Midtown, and Downtown Transit Centers.
- Develop a new loop service from UAA to Midtown Transit Center to Downtown Transit Center via Tudor Road, 36th Avenue, C Street, and A Street.
- Extend existing Bragaw Street route south past Northern Lights Boulevard to UAA Transit Center.
- Develop a route from 36th Avenue directly to Muldoon Road and then to the Muldoon, UAA, Midtown, and Downtown Transit Centers as a limited stop route.
- Improve service to the UAA employment area on the Bragaw Street/Abbott Road extension.
- Provide improved travel time and more direct access to transit riders on new Bragaw Street and 36th Avenue connections.
- With these additional improvements, the study team assumes that the full 200% increase in transit ridership, stated as a community goal, would be achieved.

Complete the Network Solution Theme: Transit Component

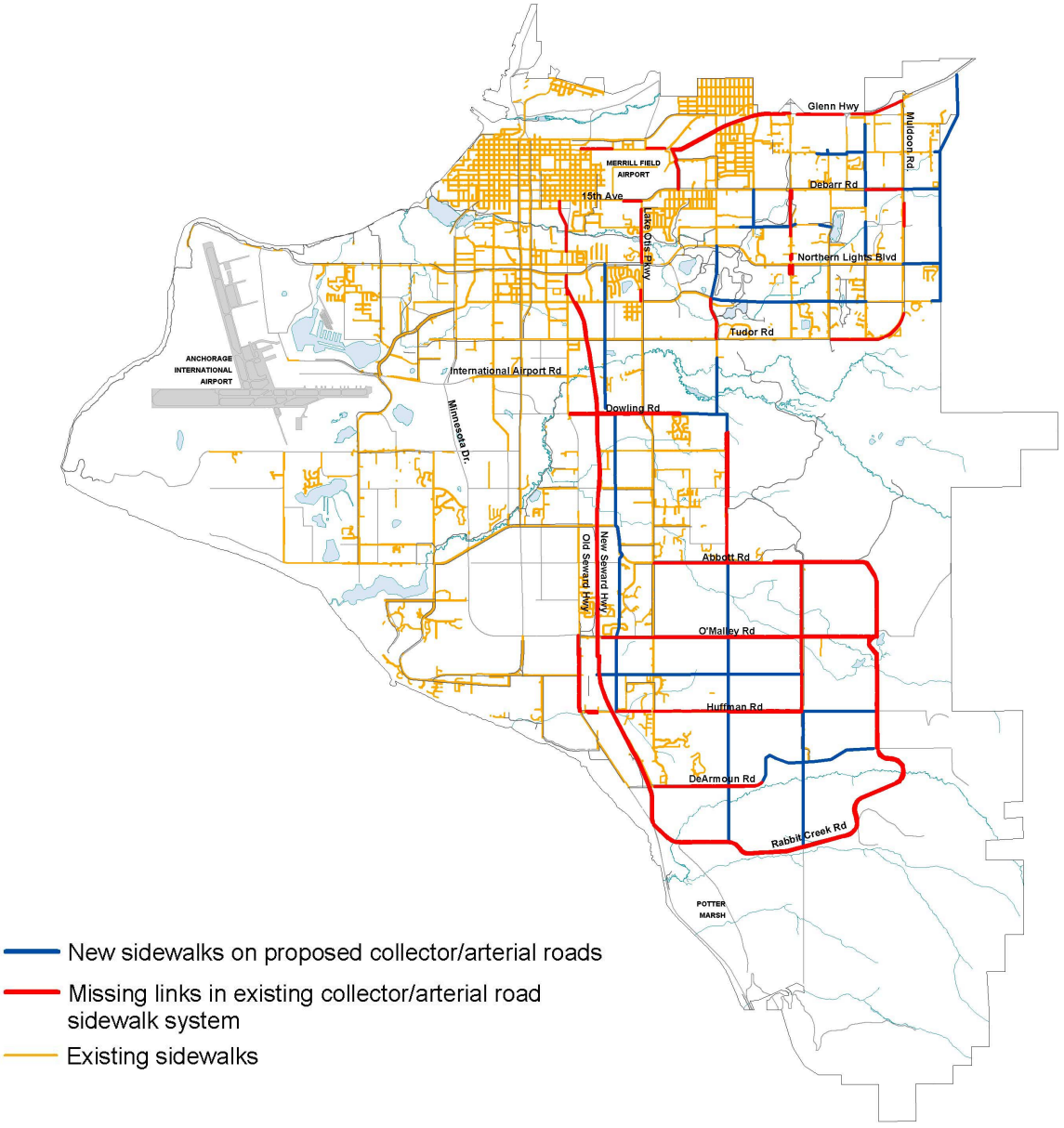


Transit Focus Area Coverage	
Transit focus area land within ¼ mile of a transit route	85%
Transit focus area residential land within ¼ mile of a transit route	85%

Complete the Network Solution Theme: Pedestrian Component

The "Complete the Network" pedestrian component, once again, builds from the base case. In addition to the enhanced pedestrian network described in that theme, sidewalks would be developed along all existing and proposed collector and arterial roads.

This map shows the additional pedestrian connections proposed as part of the Complete the Network Solution Theme. Sidewalks would be developed on both sides of all new collector and arterial road networks. In addition, missing or incomplete segments of sidewalks on both sides of the existing collector and arterial network are proposed.



Complete the Network Solution Theme: Modeling and Analysis

Traffic modeling completed under this solution theme tested a number of combinations of improvements to the missing roadway grid. The following list provides a summary of the road combinations modeled and tested.

C1. Full 1-mile and ½-mile grid network.
C2. Full 1-mile and ½-mile grid network without the question-marked roads from the LRTP.
C3. A partial road grid with the most technically difficult road segments eliminated.

The tables to the right provide a summary of criteria considered and the results of this planning level evaluation. Graphics depicting the traffic model runs can be found in Appendix C.

Findings

- The completed road grid (model run C1) had little effect on overall arterial congestion in the study area. By itself, this strategy would not provide overall congestion relief that would bring levels of service to acceptable levels in the study area. This analysis suggests that new arterial or highway lanes will be required.

- New roads on the arterial grid attract the greatest number of trips due to the adjacent land uses on the existing arterial network and the higher capacity of the arterials.

Analysis Results

Table 5
Model Statistics

Model Run	Daily VMT (Miles)	Annual VMT (Miles)	Daily VHT (Hours)	Annual VHT (Hours)	Avg. Speed (MPH)	Daily Delay (Hours)	Annual Delay (Hours)
C1	6,553,215	2,391,923,475	184,910	67,492,150	31.9	429.0	156,578.9
C2	6,740,860	2,460,413,900	190,971	69,704,415	31.9	497.1	181,429.3
C3	6,724,794	2,454,549,810	187,346	68,381,290	32.1	443.0	161,676.8
Base Case	6,779,826	2,474,636,490	197,292	72,011,580	31.6	592.1	216,116.5

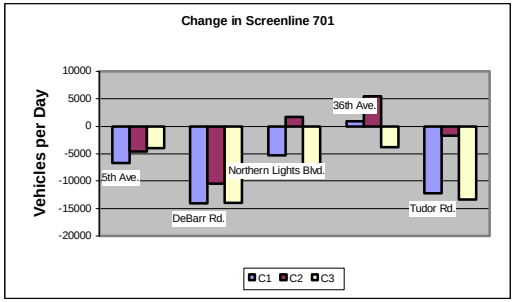
VMT = Vehicle miles traveled; VHT = Vehicle hours traveled

Table 6
Evaluation Criteria Summary

Criteria		C1	C2	C3
Residential Parcels Affected	#	435	357	435
	Acres	25.5	20.8	25.5
Industrial Parcels Affected	#	8	7	8
	Acres	2.1	2.1	2.1
Commercial Parcels Affected	#	6	4	5
	Acres	2.9	2.7	2.0
Parkland	Acres	13.0	8.1	11.1
Natural Open Spaces	Acres	34.1	31.3	15.3
Stream Crossings	#	29	26	24
Wetlands	Acres "A"	26.4	23.8	14.4
	Acres "B"	7.0	7.0	2.7
	Acres "C"	5.4	3.8	4.1
Wildlife Habitat	Acres	54.5	48.9	34.3
Nonattainment Area VMT	Daily miles	3,482,511	3,502,137	3,421,082
Carbon Monoxide	Pounds	83,913	86,080	84,041
Right of Way	$ (M)	15.7	8.3	9.8

Note: Based on road footprint impacts only.

This chart shows the change in total east-west traffic demand on an average day crossing screenline 701 (from Tudor Road north) for each of the Complete the Network model runs. Except for 36th Avenue, a slight reduction in traffic is predicted. The reduction is not sufficient to bring any of the roads into acceptable traffic congestion levels. Note the increase in traffic for 36th Avenue for both model run C1 and C2. This is likely due to the full east-west connection of 36th Avenue, and the tendency for that route to become a through route.



Complete the Network model runs showed a total east-west reduction of arterial traffic crossing screenline 701 north of Tudor Road by 37,300 ADT for C1, 9,500 for C2, and 43,700 for C3. The reduction in traffic under C1 and C3 is primarily attributed to the question-marked roads that were included in those runs.

- Collector roads did not attract or carry sufficient traffic levels to offset the need for additional capacity on the arterial system. This suggests that decisions about collector road connections should hinge more on neighborhood access and connectivity for local trip purposes than arterial congestion relief.

- Collector road grid connections that lead directly from population areas to employment centers and which parallel congested areas are likely to attract the most trips. 36th Avenue east of the University-Medical District parallels a congested route and leads directly from a high-density area into an employment center. As a result it attracts a higher number of trips than other collector roads and has a beneficial decrease in traffic on Tudor Road. This route is likely carrying more than local trips into the University-Medical District and would attract trips bypassing that section of Tudor Road. If such routes are constructed, they would likely function more like arterials, like 36th Avenue does today.

- If the southwest region of the study area remains lower density, as called for in Anchorage 2020, the ½-mile collector grid would not be required (from a traffic perspective). The collector grid would, however, promote local access for fire fighting, emergency response, and school busses. Decisions to complete the ½-mile grid in the southwest part of the study area should be considered during subarea neighborhood planning, or as part of an overall emergency response plan.

- Model run C2 tested the complete grid without the LRTP's question-marked roads. Specifically, the run tested whether Hillside traffic would filter down to C Street, Old Seward Highway, and other north-south routes to get to Midtown—thereby alleviating traffic on Lake Otis and Tudor. The model run shows little congestion relief in the congested portion of the study area. This run reinforces the finding that the Hillside traffic is only one component of the Lake Otis Parkway-Tudor Road congestion.

- Model run C3 tested the effect of removing some of the more technically challenging grid components, particularly at Baxter Bog and Cheney Lake to see how much effect they would have. Even with those connections removed from the transportation model, traffic using 36th Avenue is anticipated to have a positive benefit to Tudor Road.

- A number of other connections that were anticipated to have a higher demand if they were to be completed did not show a significant increase in traffic according to the transportation model. Routes such as 20th Avenue, 6th Avenue, and Shelikoff Street attracted few trips and had a marginal effect on adjacent congestion levels. This suggests that decisions about collector road connections should hinge more on neighborhood access and connectivity for local trip purposes than arterial congestion relief. Such connections do benefit traffic movement, but have more significant benefits to school bus access, emergency vehicle access, transit access, and neighborhood connectivity.

Solution Theme: Widen What We Have

Widen What We Have Solution Theme:
This theme explores how wide Anchorage roads would need to be if we took an approach that explored simply widening the roads we already have.

Major Components.

- ***Road**: Widen arterial and collector roads to sufficient capacity to accommodate demand.*
- ***Transit**: Base case plus widened locations for high-occupancy vehicle (HOV) lanes or transit lanes.*
- ***Land-Use**: Same as base case.*
- ***Pedestrian/Bike**: Base case plus new or separated routes along wider roads.*

This solution theme is designed to test the effect of widening existing roads and right-of-ways to provide the additional capacity needed to accommodate existing and future travel demand. Under this concept, roads would not be reclassified (for example, an existing arterial would not become an expressway or a freeway) and existing land-uses (neighborhoods, parks and open space, wetlands, University, Merrill Field) would not be bisected; instead, capacity would be added only to roads that exist.

Under this theme, the number of additional lanes needed was examined to accommodate forecast traffic demand and to explore the tradeoffs that come with adding more lanes to existing roads. Making roads wider can impact businesses and neighborhoods. It can take parkland or wetlands. It can also make for an intimidating pedestrian and bicycle environment and affect the quality of the streetscape. This theme tests where it might make sense to add capacity and what we give up as a community in exchange.

The following sections discuss the components of this solution theme in more detail.

Widen What We Have: Land Use Component

Land use patterns would continue to evolve to reflect the comprehensive plan land-use policies such as town centers, transit-supportive development corridors, employment centers, etc., as noted under the base case.

Widen What We Have: Pedestrian Component

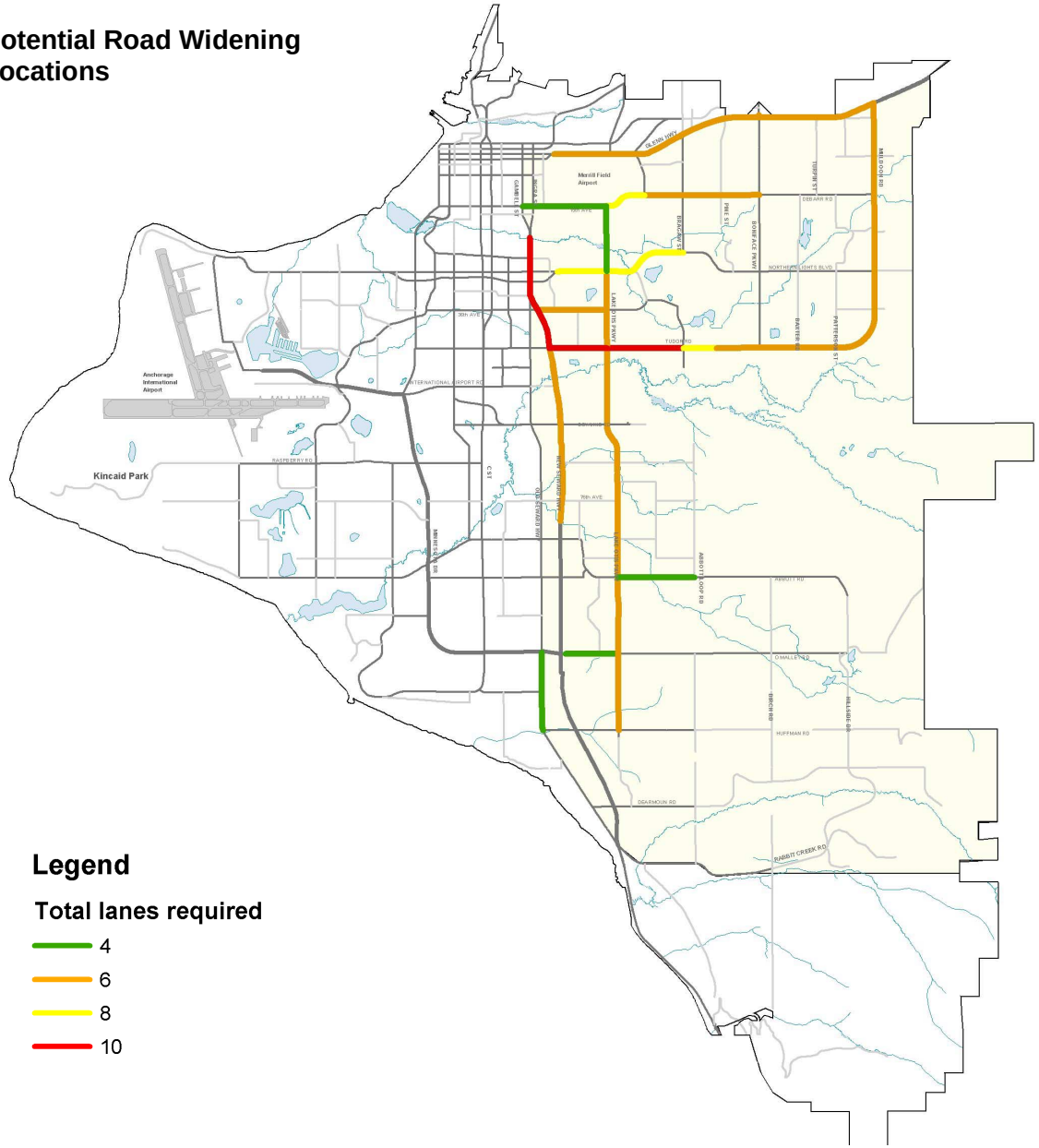
As in the other solution themes, this solution theme calls for pedestrian/bike trail and sidewalk improvements as noted in comprehensive plan policies (such as walkable environments around town centers). Additional pedestrian improvements associated with this solution theme include the opportunity for expanding bike lanes or pedestrian paths along existing rights-of-way to allow for greater separation of trails/sidewalks. The greater separation would improve safety for pedestrians and bikers as well as allow for design features, such as enhanced landscaping, to be built at a more pedestrian-friendly scale. To ensure pedestrians are able to safely cross wide streets, design changes, such as medians or other pedestrian refuges in the center of the street, would need to be considered. More pedestrian overpasses would be needed.

Widen What We Have: Road Component

In this theme, the MOA's Anchorage Transportation Model was used to test where and how wide roads would need to be to accommodate the projected increase in traffic. Roads on the arterial and collector system are widened without changing their functional classification. For example, an arterial road is not upgraded to become an expressway or a freeway. The widened roads provide additional lanes for general traffic or for use as high-occupancy vehicle (HOV) lanes. The lanes could be 24-hour HOV lanes or enforced only during rush hour to promote ride sharing or vanpools.

Roads targeted for more lanes correspond to forecasted 2023 traffic "hot spots" (see the report titled "Forecast" prepared as part of the study for a map depicting forecast average daily traffic). The map at the right depicts an estimate of how many lanes could be needed to handle the traffic forecast if no new connections were built and the functional class of the roadways was to remain the same.

Potential Road Widening Locations



Widen What We Have: Transit Component

This theme's transit component, like all solution themes, calls for the implementation of all the comprehensive plan's transit policies (15-minute frequencies, transit centers, etc.) and People Mover's planned route restructure. To those baseline conditions, this theme assumes that transit improvements to complement a widened road network would need to occur to bring us up to the LRTP goal of achieving a 200% increase. New lanes, for example, could be dedicated as transit lanes. The widened roadways would allow for transit amenities. Sections of roads could also be widened for transit queue-jumper lanes. Other transit solutions considered part of this solution theme are listed below.

- Develop a transit corridor between the University/Medical District, Midtown, and Downtown. Dedicated transit lanes would provide a time advantage for transit connections between the three major employment centers. Existing and new bus routes would feed the Downtown Transit Center and a transit center at Providence Medical Center.
- Develop a new limited-stop bus route linking Muldoon Road to the UAA, Midtown, and Downtown Transit Centers.
- Develop a new loop service from UAA to the Midtown Transit Center to the Downtown Transit Center via Tudor Road, 36th Avenue, C Street, and A Street.
- Develop a new express bus route from Eagle River to the Muldoon Town Center to the UAA Transit Center via Muldoon Road/36th Avenue or Tudor Road. This route would then continue on to the Midtown and Downtown Transit Centers.
- Add service to the existing express bus route from Eagle River to the Downtown Transit Center via the Glenn Highway.
- Develop a new limited-stop bus route from the Huffman Town Center to UAA via Lake Otis Parkway then to the Northway Town Center.

With these additional improvements, the study team assumes that the full 200% increase in transit ridership, stated as a community goal, would be achieved.

Widen What We Have: Modeling and Analysis

Only one model run was developed to test the widening theme. The tables to the right provide a summary of criteria considered and the results of this planning level evaluation. Graphics depicting the transportation model run can be found in Appendix D.

Findings

- Widening tested less-constrained demand conditions and shows where travel demand would be heaviest based on origins, destinations, and routes rather than on avoiding congested areas. This analysis suggests that the heaviest growth in traffic is headed into the Midtown area. Heavy zigzagging diagonal traffic patterns are characteristic of Anchorage travel based on the modeled data.

- The amount of traffic demand over capacity that the arterials experience suggests that widening with additional arterial lanes alone will not solve the traffic congestion. The anticipated traffic loads are too high for arterial roads with at-grade intersections. In other words, new roads will be needed, or the functional class of one or more of arterials would need to increase – i.e., changing an existing arterial to an expressway or freeway. In other words, we cannot widen our way out of the problem, because the carrying capacity of the roads as arterials will be reached before the traffic demand is met.

Analysis Results

Table 7
Model Statistics

Model Run	Daily VMT (Miles)	Annual VMT (Miles)	Daily VHT (Hours)	Annual VHT (Hours)	Avg. Speed (MPH)	Daily Delay (Hours)	Annual Delay (Hours)
D1	6,615,795	2,414,765,175	182,398	66,575,270	32.1	363.1	132,525.4
Base Case	6,779,826	2,474,636,490	197,292	72,011,580	31.6	592.1	216,116.5

VMT = Vehicle miles traveled; VHT = Vehicle hours traveled

Table 8
Evaluation Criteria Summary

Criteria		D1
Residential Parcels Affected	#	399
	Acres	13.1
Industrial Parcels Affected	#	18
	Acres	1.5
Commercial Parcels Affected	#	238
	Acres	13.1
Parkland	Acres	4.6
Natural Open Spaces	Acres	6.7
Stream Crossings	#	23
Wetlands	Acres "A"	.6
	Acres "B"	.1
	Acres "C"	.5
Wildlife Habitat	Acres	34.3
Nonattainment Area VMT	Daily miles	3,576,715
Carbon Monoxide	Pounds	82,394
Right of way	$ (M)	16

Note: Based on road footprint impacts only.

Solution Theme: Provide Land Use and Transit Choices

Provide Land Use and Transit Choices Solution Theme:
This theme tests the extent to which land-use and pedestrian changes coupled with transit improvements can help solve congestion.

Major Components:

Road: *Same as Base Case Solution Theme.*

Transit: *Same as Base Case Solution Theme plus innovative transit strategies and additional routes.*

Land-Use: *Same as Base Case Solution Theme plus housing and employment density shifts beyond base conditions.*

Pedestrian/Bike: *Base Case Solution Theme plus sidewalks on all streets in the urban area of Anchorage.*

This solution theme tests the extent to which land-use changes coupled with transit improvements can help solve congestion by getting more people off the road system. This is a fairly progressive option, one that many other cities are pursuing in an attempt to get at the root of their transportation problems instead of just dealing with the symptoms. The core problem is that segregating uses in separate areas (i.e., separating residential from commercial, industrial, and other uses) results in people needing to travel to multiple areas to meet their daily needs. For example, they live in one part of town but have to travel to a different part of town to work, and to another part of town to shop. If people were able to meet more of their needs locally, it would reduce trip generation and thereby reduce the demand on the existing road network. It would also make transit a more attractive transportation option as trips would be made shorter and destinations would be more easily accessible by transit and, in some cases, less automobile friendly.

The emphasis of this theme is on changing transportation patterns through implementing innovative land use patterns along with increased pedestrian, bike, and transit options, generally within the guidelines of the Anchorage 2020 Comprehensive Plan. In response to public comment, two scenarios (noted as Scenario A and Scenario B) have been developed to explore this concept.

Scenario A: Provide Land-Use and Transit Choices

Scenario A: Road Component

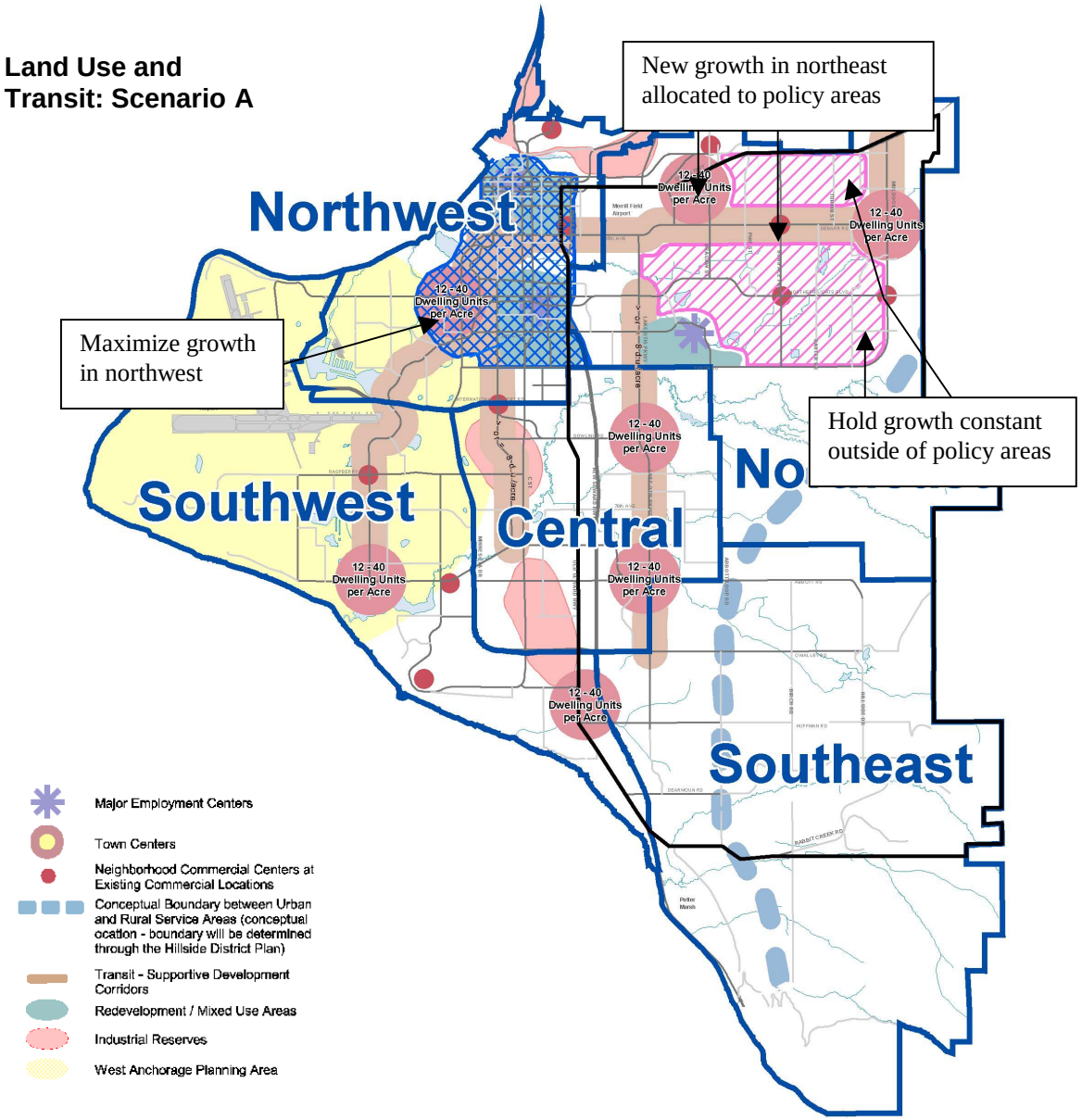
Road improvements would be limited to the Base Case Solution Theme.

Scenario A: Land Use Component

This solution theme is designed to explore the effect of balancing land use with transportation network capacity. The land-use component of this theme tests the effect of limiting population growth in some areas, while encouraging density increases in other areas.

In addition to implementing all the components of the comprehensive plan, under this solution theme population density would be increased in areas within walking distance of (1) the new town centers, (2) employment centers, and (3) the east-west arterials with transit service beyond those in the Base Case Solution Theme.

Population growth would be discouraged in the Northeast Planning Area and encouraged in the Northwest Planning Area. This would have the effect of reducing the travel burden on east-west arterials in the northeast quadrant and encouraging growth within walking distance of the Downtown and Midtown employment centers. Areas between the arterials farther than ¼ mile from transit service would be held at roughly existing population densities. Additional growth not accommodated in Northeast Anchorage would be distributed to Midtown, Downtown, and along A and C Streets.



Scenario A: Transit Component

Under this solution theme, the transit system articulated under the Base Case Solution Theme is supplemented with the following ***innovative transit strategies:***

- Circulator route to provide fast, efficient, and frequent service between employment centers. Other buses would connect to the circulator.
- Express bus service.
- Limited-stop service.
- Transit corridors: Lake Otis Parkway, Tudor Road, Northern Lights Boulevard, Old Seward Highway, Arctic Boulevard.
- Increased transit service frequency on all routes at 30 minutes or better all day during the week, and 60-minute or better frequencies on weekends.
- Convenient bus stop placement—adjacent to commercial parcels so that the distance between the bus stop and the rider's final destination is minimized.
- Bus stop improvements, such as heated shelters at most stops.
- Expanded and improved Downtown transit facility. Undercover, intermodal centers in Midtown, University-Medical District, and Northway areas to facilitate inter-route and bus/pedestrian transfers.
- Signal prioritization for transit service at key intersections.
- Innovative fare options, such as free fares during the winter carbon monoxide season, deeply discounted passes, fare pre-payment, and easy to use cash fare policies ($1.00 instead of odd amounts, for example).

The following ***route improvements*** are also included in this scenario:

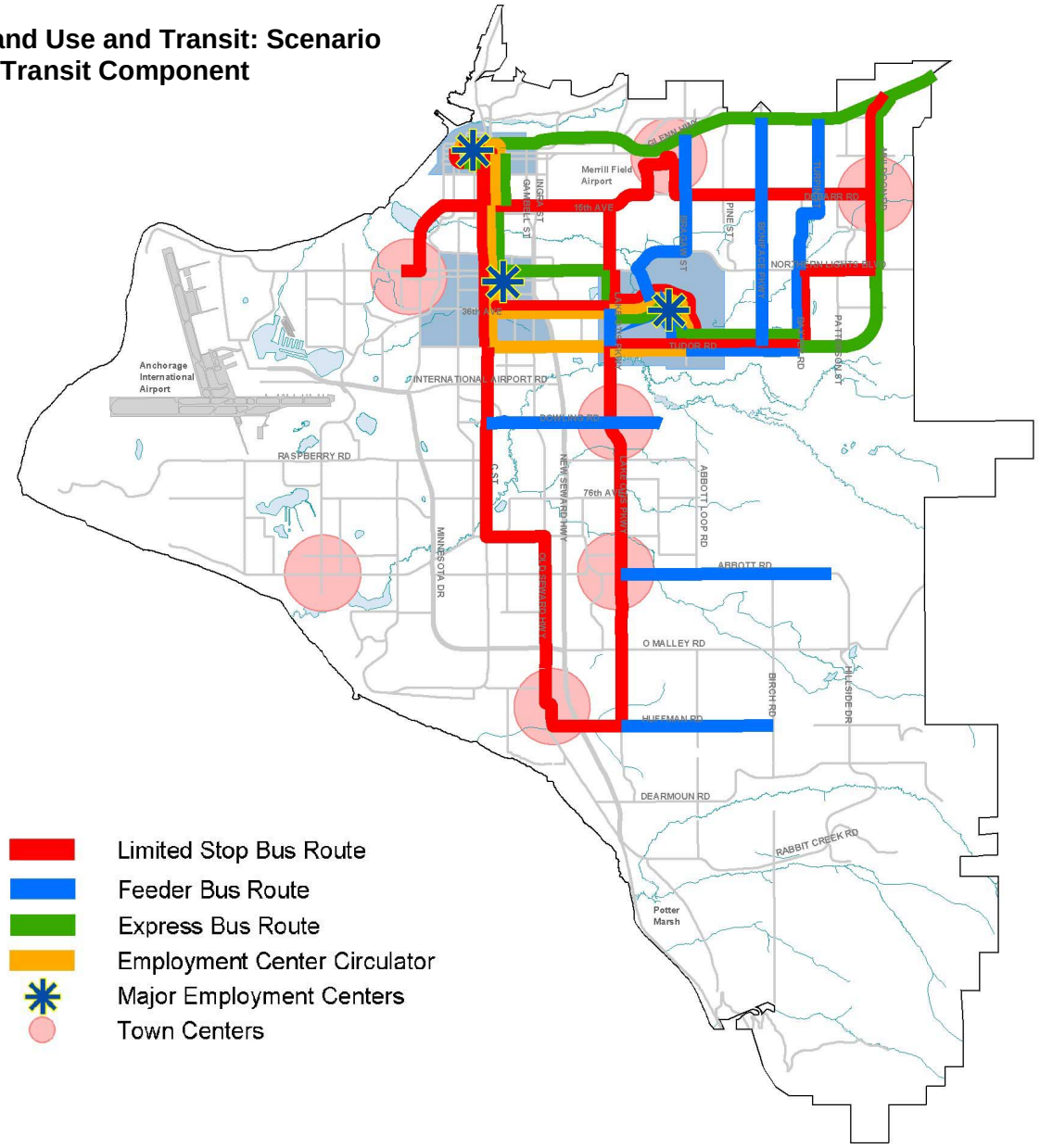
- Express bus route from Eagle River to Muldoon Town Center to UAA Transit Center via Muldoon-Tudor Roads then on to the Midtown Transit Center and the Downtown Transit Center.
- Additional service to existing express bus route from Eagle River to the Downtown Transit Center via the Glenn Highway.
- Limited-stop route from the Huffman Town Center to UAA via Lake Otis Parkway then to the Northway Town Center.
- Limited-stop route from the Huffman Town Center to Dimond Boulevard via Old Seward Highway to Midtown via C Street and Downtown Transit Center.
- Limited-stop east-west service from the Muldoon Town Center to the Northway Town Center, Downtown, and West Anchorage.

- Limited-stop bus route linking Muldoon to UAA Transit Center, Midtown, and Downtown Transit Centers.
- New loop service from UAA to Midtown Transit Center to Downtown Transit Center via Tudor Road, 36th Avenue, C Street, and A Street.

Scenario A: Pedestrian Component

As in the other solution themes, this scenario calls for pedestrian/bike trail and sidewalk improvements as noted in comprehensive plan policies (such as walkable environments around town centers). Also, walking and biking would be easier because more destinations would be within walking/biking range of denser housing.

Land Use and Transit: Scenario A Transit Component



Scenario B: Provide Land Use and Transit Choices

A second land use and transit scenario has been developed in response to suggestions from the public for a further test of land use and transit options. Components of this scenario are described below.

Scenario B: Road Component

Similar to Scenario A, road improvements would be limited to those in the Base Case Solution Theme.

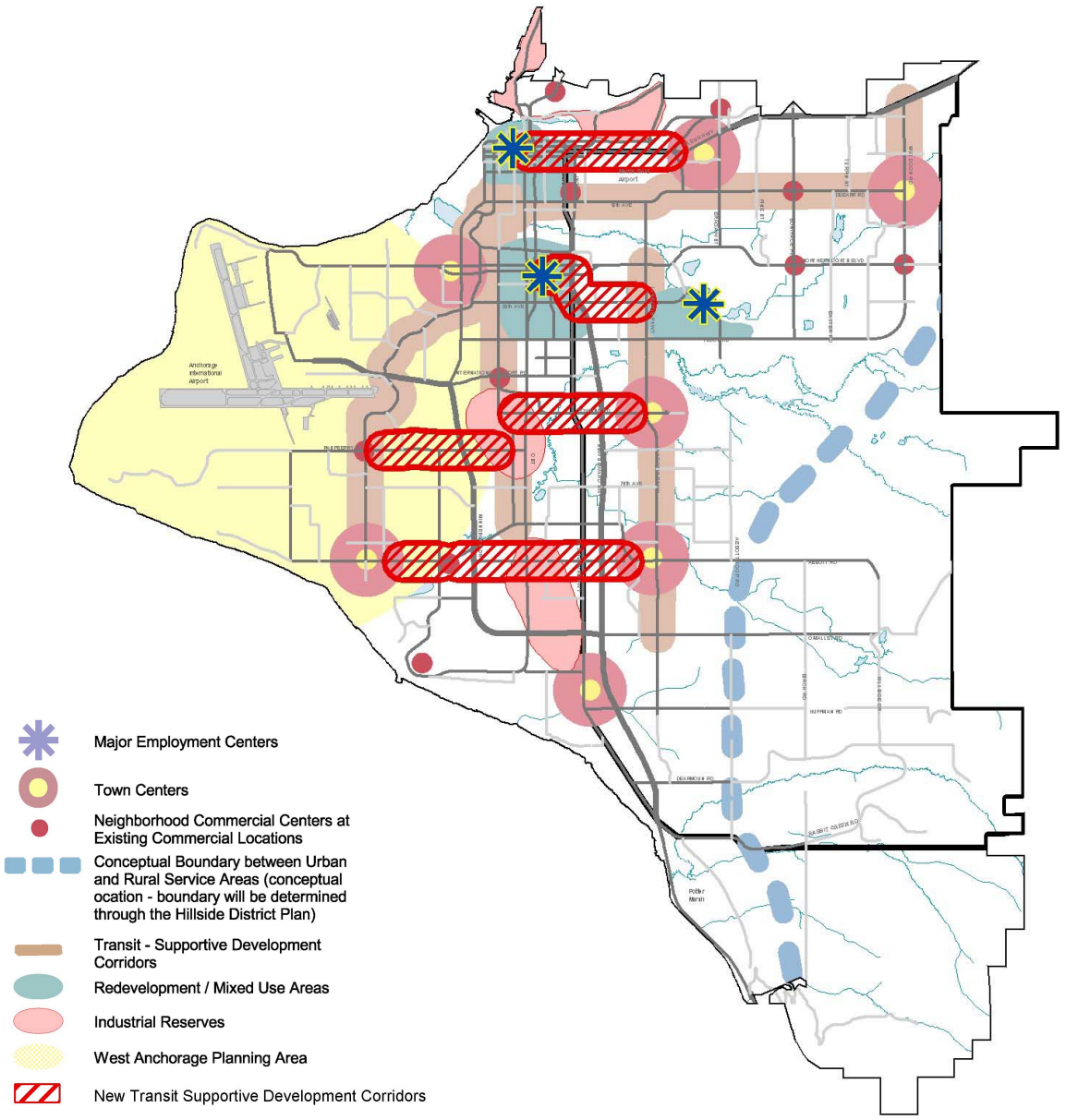
Scenario B: Pedestrian Component

Similar to Scenario A, Scenario B calls for pedestrian improvements on all streets within policy areas.

Scenario B: Land Use Component

Unlike Scenario A, Scenario B would allocate half of the 2023 population and employment growth to the three major employment centers, the central business district, transit-supportive development corridors (described in more detail in the next section), and the town centers. Highest densities would be on streets where buses run frequently.

It should be noted that not all of this scenario's proposed land use components are consistent with Anchorage 2020. Some identified transit development corridors were suggested by members of the public and do not reflect Anchorage 2020 policy areas. These "new" corridors are distinguished from Anchorage 2020 transit supportive development corridors by red hatch marks on the map to the right.



Scenario B: Transit Component

The key component of transit improvement under this scenario is the development of additional transit supportive development corridors. As noted above, these corridors are intended to facilitate transit use by creating pedestrian friendly, higher-density housing areas along certain transportation corridors with a corresponding increase in transit service.

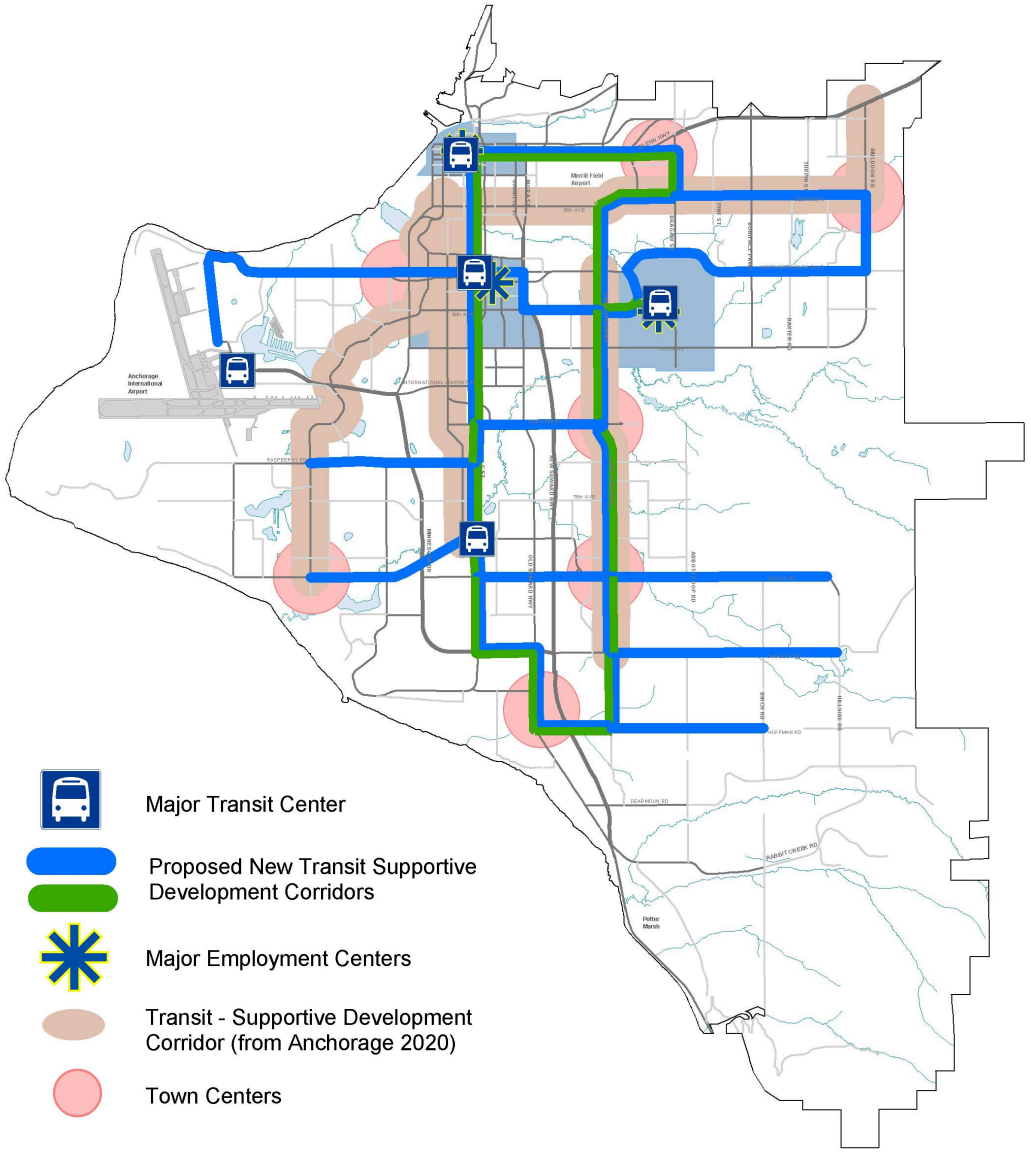
In addition to the transit corridors noted in Anchorage 2020, Scenario B would locate transit routes in the following additional areas for the following purposes:

- East-west to connect the Midtown employment center to the university-medical employment center.
- East-west to connect the central business district to the Northway Town Center.
- East-west on Dowling Road to connect the town center at Dowling Road and Lake Otis Parkway to the Arctic Boulevard Transit-Supportive Development Corridor.
- East-west along Raspberry Road from Jewel Lake to Arctic Boulevard.
- East-west on 92nd Avenue to connect the Abbott Town Center to the Dimond Town Center and to increase access to the Dimond shopping complex.

A circulator route (in green) would link major transit and employment centers.

Other transit improvements include:

- Anchorage 2020 transit frequencies on the transit-supportive development corridors.
- A few blocks of bus-only lanes in congested corridors.
- Signal activation for all buses, with bus-only lanes at most CBD and corridor intersections.
- Advanced Transit Information Systems (ATIS), providing real-time positions for all buses and estimated time of arrival at all stops.
- Headways increased to 10 or 15 minutes on important transit routes during peak periods.



Land Use and Transit: Modeling and Analysis

Findings

Under Scenario A, the traffic model indicated slight increases in trips on roadways surrounding policy areas, i.e., corresponding with areas where additional housing density was added. Transit mode share improved only slightly, as did the walking and biking mode share. Such a finding would suggest that Anchorage transit ridership is not highly sensitive to land use and service frequency.

Overall network vehicle miles traveled, vehicle hours traveled, and delay measures actually increased. Such a finding is not inconsistent with what could actually happen as we begin to implement density improvements through the Anchorage 2020 Comprehensive Plan. If density is added to areas that are already congested with vehicles (Lake Otis Parkway– which Anchorage 2020 identifies for two town centers and a transit corridor), the additional households (density) will increase transit ridership, but will also add vehicles, which could exacerbate congestion on pts

Analysis Results

Table 9
Model Statistics

Model Run	Daily VMT (Miles)	Annual VMT (Miles)	Daily VHT (Hours)	Annual VHT (Hours)	Avg. Speed (MPH)	Daily Delay (Hours)	Annual Delay (Hours)
Base Case	6,779,826	2,474,636,490	197,292	72,011,580	31.6	592.1	216,116
Scenario A	6,908,368	2,521,554,320	206,917	75,524,705	31.3	692.9	252,921
Scenario B	6,969,448	2,543,848,520	208,966	76,272,590	31.1	706.5	257,866

Table 10
Transit Evaluation Criteria Summary

		Base Case	Scenario A	Scenario B
Drive Alone (Daily Trips)	#	905,527	904,282	955,703
	%	51.24%	51.17	5.1.25%
Carpool (Daily Trips)	#	797,941	797,328	840,816
	%	45.14%	45.12	45.09%
Transit (Daily Trips)	#	20,080	21,765	21,703
	%	1.14%	1.23	1.16%
Bike/Walk (Daily Trips)	#	43,813	44,593	46,654
	%	2.48%	2.52	2.50%
Transit focus area land within ¼ mile of a transit route	%	82.0%	83.8%	85.1%
Transit focus area residential land within ¼ mile of a transit route	%	83.0%	84.0%	84.0%

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Table 11
Evaluation Criteria Summary

Criteria		Scenario A	Scenario B
Residential Parcels Affected	#	0	0
	Acres	0	0
Industrial Parcels Affected	#	0	0
	Acres	0	0
Commercial Parcels Affected	#	0	0
	Acres	0	0
Parkland	Acres	0	0
Natural Open Spaces	Acres	0	0
Stream Crossings	??	0	0
Wetlands	Acres "A"	0	0
	Acres "B"	0	0
	Acres "C"	0	0
Wildlife Habitat	Acres	0	0
Nonattainment Area VMT	Daily miles	3,647,230	3,656,692
Carbon Monoxide	Pounds	93,546	94,117
Right of Way	$ (M)	0	0

Note: based on road footprint impacts only. There may be impacts associated with other aspects of improvements.

the corridor. The model attempts to predict human behavior and diverts traffic around the increasing congestion, which may help to explain the transportation model statistics; it is also possible that is what could happen as we implement Anchorage 2020. Another factor that could help explain the modeled result is that by shifting employment to Midtown under Scenario A, we may have actually increased the home-work trip lengths for households that do not have office employees. We assume when Anchorage 2020 calls for increased housing density near employment centers that those working in these centers will live in homes nearby. If this does not occur, (if, for instance, people working at the military bases moved into that housing), the trip lengths could actually increase. It is not clear whether that happened in the model run, but it does point out a possibility in the real world. It also points to the need to have good market analysis to target the type of house to match the type of housing desired by office employees if the intention is to increase walk-to-work trips in the three employment centers identified in Anchorage 2020.

Under neither scenario did transit show a high correlation (sensitivity) to land use and transit changes. The potential reasons for the lack of sensitivity in the variable are:

- The relatively small number of households with which to begin to change the urban fabric. There are approximately 95,000 households in the Anchorage Bowl with a prediction by the Institute of Social and Economic Research of an additional 27,500 over the next 20 years (ISER 2001). The team targeted an aggressive 50% of the future growth into policy areas (13,000 dwelling units). Those 13,000 dwelling units are spread among five transit development corridors ½ mile wide and seven town centers 1 mile in diameter.
- Anchorage employment centers are relatively low density. Achieving the employment density called for in Anchorage 2020 at the three employment centers is difficult – only office-type employment can achieve the 50 employees per acre called for in the plan and there is only so much office employment forecast to occur in Anchorage over the next 20 years. There is not enough office employment forecast by ISER to achieve the called for employment densities in all of the transportation analysis zones that comprise the three employment centers.
- Despite the plan's call for three employment centers, Anchorage really has five or more (Downtown, Midtown, the University-Medical District, Ted Stevens International Airport, Elmendorf/Fort Richardson, and the Dimond Center area). This dispersion of employment (destinations) is one of the greatest challenges to effective bus service for the home to work trip (the trips during which our worst traffic congestion occurs). It is also the reason that the traffic model may not show great sensitivity to transit.

Under Scenario B, mode share increased slightly for transit and walking, but did not show dramatic improvements as compared to the base case. The reasons for only a marginal improvement could be that by adding too many locations for high-density housing, the ability to achieve transit-supporting densities in all of the policy areas was actually diluted as compared to the base case. Essentially, there is not sufficient new growth projected to fill up all of the policy areas envisioned in Scenario B at transit supporting densities. Moreover, vehicle miles traveled, vehicle hours traveled, and delay all increased slightly. Reasons for this could include the location of the additional density as compared to the base case. Because the proposed additional transit development corridors are in areas that are already congested, traffic congestion there was exacerbated slightly. The increase in congestion causes drivers to go out of their way to avoid those areas.

Solution Theme: Provide Major Cross-Town Connections

Provide Major Cross Town Connections Solution Theme:
This theme tests the effect of concentrating more of the travel on fewer, but more-efficient, through-town routes.

Major Components:

- ***Road:*** *Freeways, expressways, and/or bypasses with a limited number of intersecting roads or driveways.*
- ***Transit****: Base Case Solution Theme plus new express bus routes and limited-stop bus routes on new roads.*
- ***Land-Use****: Base Case Solution Theme.*
- ***Pedestrian/Bike****: Base Case Solution Theme.*

The Provide Major Cross-Town Connections Solution Theme provides a framework for testing the effect of concentrating more of the travel on fewer, but more-efficient, through-town routes. The following sections discuss the components of this theme in more detail.

Major Cross-Town Connections: Land Use Component

Land use patterns would continue to evolve to reflect the comprehensive plan land-use policies such as town centers, transit-supportive development corridors, employment centers, etc. For more detail, see the discussion under the Base Case Solution Theme.

Major Cross-Town Connections: Pedestrian Component

This solution theme calls for pedestrian/bike trail and sidewalk improvements as noted in the comprehensive plan (such as walkable environments around town centers) and described in the Base Case Solution Theme.

Major Cross-Town Connections: Road Component

Under this solution theme, road connections would occur as freeways (like the Seward Highway south of Tudor Road), expressways (such as International Airport Road), and/or bypasses (like Minnesota Bypass). Each of these types of roads has a limited number of intersecting roads or driveways and focuses on through-traffic not local access.

As the map on the following page depicts, a number of major connections were analyzed. These include the following:

East City Bypass. The East City Bypass provides a new route near Muldoon and Tudor Roads and includes interchanges at the Glenn and Seward Highways, as well as at Debarr Road, Northern Lights Boulevard, Muldoon Road, Boniface Parkway, and Bragaw Street.

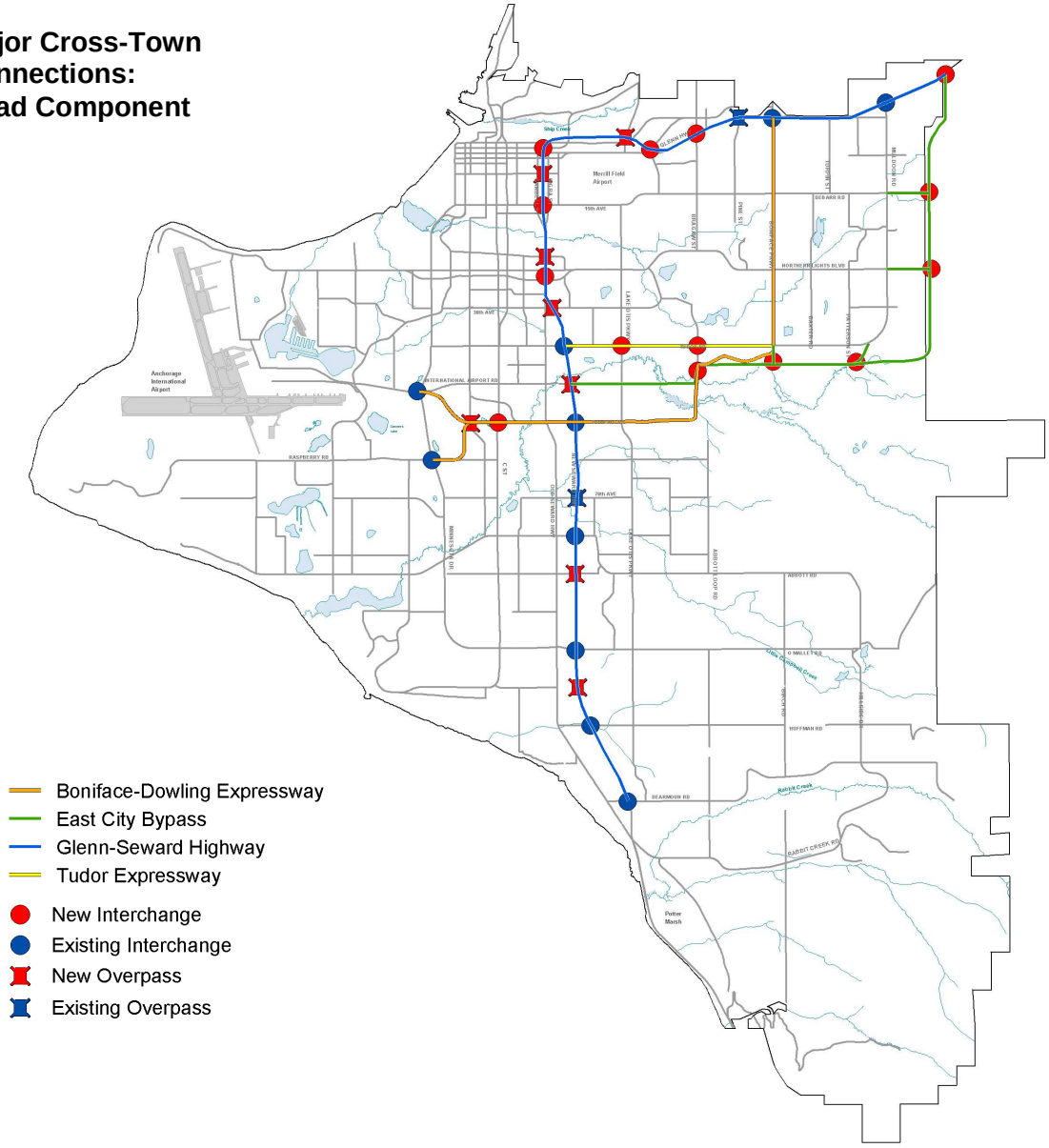
Glenn/Seward Highway Freeway Connection. This route completes the controlled access highway through Anchorage. Interchanges and overpasses would be used to connect at key arterials and allow collector roads to go over or under the freeway. It is possible that this solution would include an underground element through Fairview and/or Mountain View.

Boniface-Dowling Parkway. This parkway provides an additional north/south connection as well as another east/west connection and effectively functions as a through-town route connecting the Glenn and New Seward Highways, Minnesota Bypass, and Raspberry and/or International Airport Roads. Grade separations would be explored at key connection points.

Tudor Expressway. The Tudor Expressway starts at the New Seward Highway and continue east past Bragaw Street. It would incorporate an overpass at Lake Otis Parkway. Access to commercial areas adjacent to Tudor Road would be on frontage roads. The road could also potentially function as a viaduct to bypass the area or as a viaduct with inbound traffic on one level and outbound traffic on the other.

These major cross-town connections are modeled separately and in combination to test a more complete freeway-expressway system.

Major Cross-Town Connections: Road Component



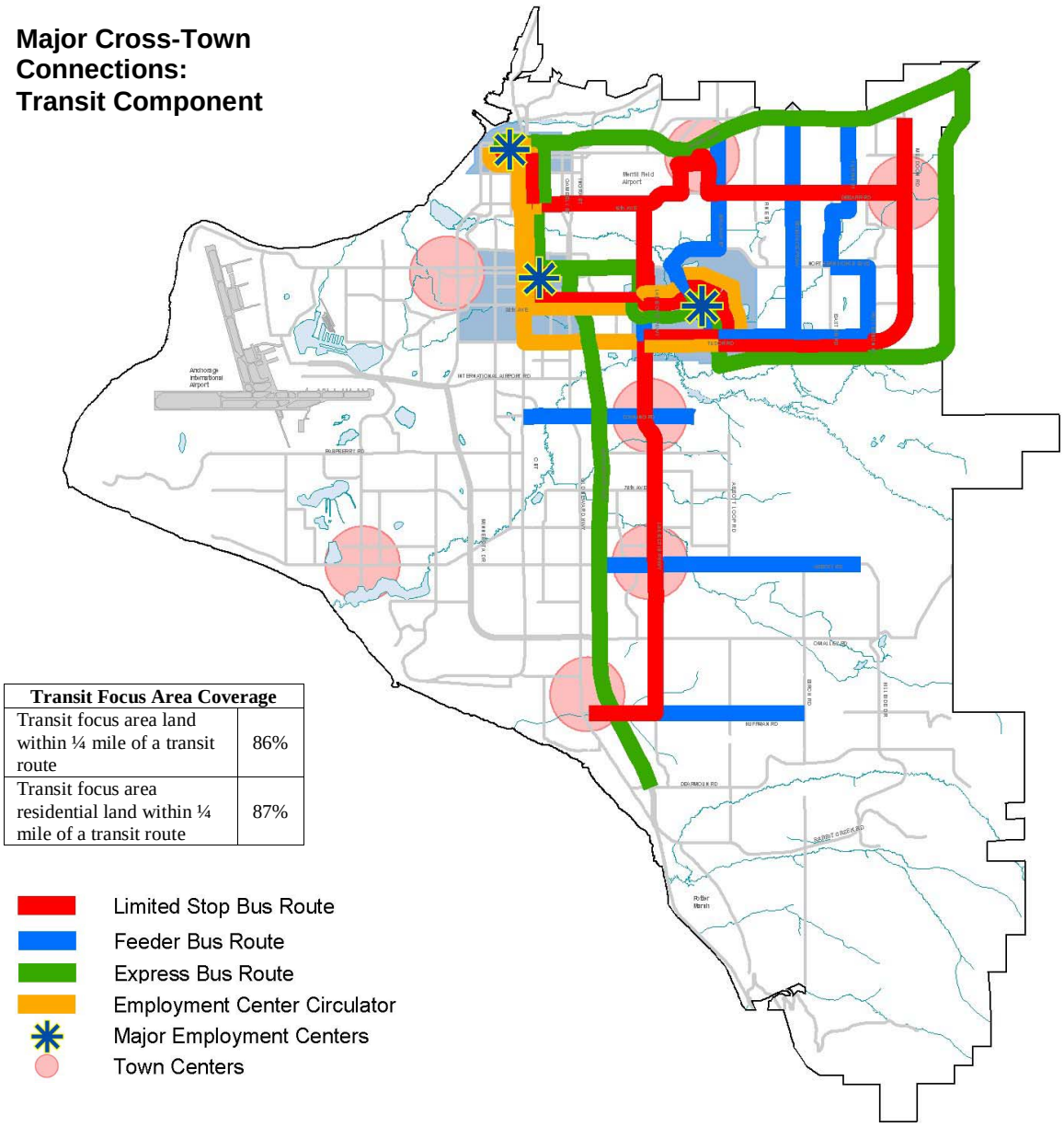
Provide Major Cross-Town Connections: Transit Component

This solution theme's transit connections include all Base Case Solution Theme assumptions and the following theme-specific improvements:

- Develop a new express bus route from Eagle River to Muldoon Town Center to UAA Transit Center via Muldoon Road/36th Avenue or Tudor Road and then on to the Midtown Transit Center and the Downtown Transit Center.
- Add to existing express bus route from Eagle River to the Downtown Transit Center via Glenn Highway.
- Develop a new limited-stop bus route from the Huffman Town Center to Dimond via Lake Otis Parkway and then to UAA via Lake Otis Parkway then to the Northway Town Center.
- Develop a new limited-stop bus route linking Muldoon Road to UAA Transit Center, Midtown, and Downtown Transit Centers.
- Develop a new loop service from UAA to Midtown Transit Center to Downtown Transit Center via Tudor Road, 36th Avenue, C Street, and A Street.
- Explore affect of the Bragaw Street/Abbott Road extension and the 36th Avenue connection to improve service to the UAA employment area.
- Use new roadway links for express bus service where possible to improve point-to-point transit travel time.

With these additional improvements, the study team assumes that the full 200% increase in transit ridership, stated as a community goal, would be achieved.

Major Cross-Town Connections: Transit Component



Transit Focus Area Coverage	
Transit focus area land within ¼ mile of a transit route	86%
Transit focus area residential land within ¼ mile of a transit route	87%

Provide Major Cross Town Connections: Modeling and Analysis

Traffic modeling completed under this solution theme tested a number of major cross-town connections. The following list provides a summary of the road combinations modeled and tested.

F1. New Seward/Glenn Freeway Connection
F2. Tudor Road Double Decked with an Interchange at Lake Otis Parkway-Tudor Road Intersection
F3. Tudor Expressway with Grade Separation of Lake Otis Parkway and Tudor Road Intersection
F4. East City Bypass (East of Muldoon Road) to International Airport Road
F5. East City Bypass (East of Muldoon Road) to Dowling Road
F6. East City Bypass (From Muldoon Road) to International Airport Road
F7. Boniface Parkway to International Airport Road Expressway with Grade Separations
F8. Boniface Parkway/Dowling Road Expressway to International Airport and Raspberry Roads (4 lanes)
F9. Boniface Parkway /Dowling Road Expressway to Raspberry Road (4 lanes)
F10. Boniface Parkway/ Dowling Road Expressway to International Airport Road (4 lanes)

The tables to the right provide a summary of criteria considered and the results of this planning level evaluation. The transportation model runs can be found in Appendix F.

Analysis Results

Table 12
Model Statistics

Model Run	Daily VMT (Miles)	Annual VMT (Miles)	Daily VHT (Hours)	Annual VHT (Hours)	Avg. Speed (MPH)	Daily Delay (Hours)	Annual Delay (Hours)
F1	6,799,203	2,481,709,095	180,176	65,764,240	32.6	379.1	138,359.3
F2	6,727,598	2,455,573,270	190,708	69,608,420	32.1	507.9	185,383.5
F3	6,742,667	2,461,073,455	188,925	68,957,625	32	476.2	173,794.8
F4	6,780,466	2,474,870,090	183,054	66,814,710	32.6	401.9	146,693.5
F5	6,768,080	2,470,349,200	184,690	67,411,850	32.4	421.7	153,908.3
F6	6,750,736	2,464,018,640	185,568	67,732,320	32.4	438.1	159,912.6
F7	6,754,097	2,465,245,405	185,998	67,889,270	32.4	454.4	165,868.2
F8	6,744,657	2,461,799,805	181,679	66,312,835	32.7	387.1	141,273.3
F9	6,758,419	2,466,822,935	182,391	66,572,715	32.6	390.4	142,508.2
F10	6,764,121	2,468,904,165	183,411	66,945,015	32.6	402.6	146,936.8

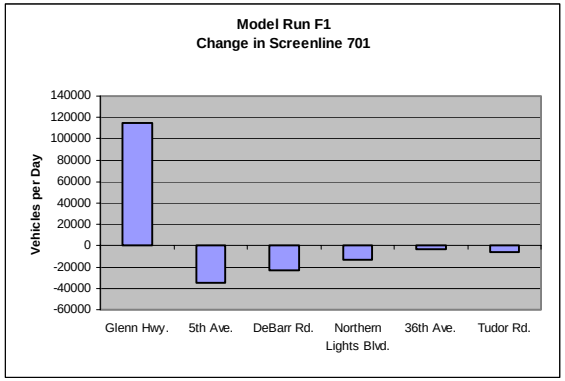
VMT = Vehicle miles traveled; VHT = Vehicle hours traveled

Table 13
Evaluation Criteria Summary

Criteria		F1	F 2	F 3	F 4	F 5	F 6	F 7	F 8	F9	F10
Residential Parcels Affected	#	22	21	21	124	61	69	117	122	122	166
	Acres	3.3	2.6	4.6	13.7	4.6	9.3	11.4	11.4	11.4	19.2
Industrial Parcels Affected	#	6	0	0	2	13	1	34	35	31	3
	Acres	2.4	0	0	3.3	4.8	2.7	15.1	15.5	9.1	2
Commercial Parcels Affected	#	7	44	44	9	25	5	66	66	65	28
	Acres	0.1	8.9	11.1	6.1	8.4	0.4	10.1	10.1	9.5	4.8
Parkland	Acres	0.4	0	0	63.0	48.6	41.3	2.7	2.7	2.7	17.2
Natural Open Spaces	Acres	2.7	6.6	7.1	99.6	106.3	78.0	47.7	48.0	48.0	40.9
Stream Crossings	#	7	2	2	24	25	13	5	5	5	4
Wetlands	Acres "A"	0	0.1	0.	98.4	101.8	42.1	21.9	22.3	22.3	18.0
	Acres "B"	0.1	0.1	0.1	12.8	12.8	11.3	14.8	15.3	14.8	14.9
	Acres "C"	1.6	0	0	3.9	2.9	3.7	2.5	2.5	2.5	3.7
Wildlife Habitat	Acres	6.1	9.7	10.5	153.2	159.5	80.5	57.9	59.8	59.3	46.6
Nonattainment Area VMT	Daily miles	3,627, 765	3,422, 329	3,425, 373	3,253, 295	3,254, 899	3,318, 152	3,405, 278	3,355, 065	3,379, 261	3,382, 111
Carbon Monoxide	Pounds	79,924	85,780	84,948	82,112	83,218	82,979	82,928	80,773	81,256	81,769
Right of Way	$ (M)	4.7	7.3	9.3	14.7	7.4	9.1	20	20	14.9	17.4

Note: based on road footprint impacts only.

Findings



This run shows the change in vehicles per day as compared to the base case moving east-west across the screenline that is just east of Lake Otis Parkway (north of Tudor) for the model run connecting the Glenn Highway and Seward Highway together (model run F1). Note the large number of trips attracted to the Glenn Highway in its own alignment. Note also the small affect that the connection has on 36th Avenue and Tudor Road.

- A Glenn-Seward Freeway connection would reduce traffic on almost all arterials in the northeast part of the study area. If developed on a new alignment north of 3rd Avenue starting at Airport Heights, it would add 6 or 8 new lanes of freeway capacity east-west, allowing capacity on 5th Avenue to remain in tact. Similarly, if developed on an alignment with Hyder Road, it would reduce traffic on Gambell and Ingra, but allow that capacity to continue to function for local access. Of any of the tested solutions, except for road widening, the Glenn-Seward connection had the greatest effect on reducing delay. Heavy traffic between Downtown and Midtown on a freeway connection could require 8 to 10 lanes.

- Despite good benefits on the overall traffic statistics, the Glenn-Seward Freeway connection does not have a significant effect on Lake Otis and Tudor. This suggests that the traffic problems affecting the northwest portion of the study area (5th Avenue, Gambell, Ingra, Northern Lights Benson) are independent of the traffic problems affecting Lake Otis and Tudor.

- Given the historic land development patterns and origin-destination patterns, Tudor Road is the route that has the highest demand. Adding capacity along Tudor Road (whether it be in the form of a grade separated interchange, additional lanes of capacity, or a change in functional class) would attract considerable numbers of trips. The modeling suggests that if capacity improvements are concentrated in that corridor, Tudor Road would need to be converted to a freeway before the capacity would satisfy the demand.

- Testing grade separations and expressway concepts along Tudor Road (model runs F2 and F3) indicate that those improvements would draw a freeway level of demand. Unless a high capacity expressway or freeway were to be put in through Tudor's entire length, the demand would threaten to overload the facility. Putting in a grade separation would ease traffic flow, but modeling would suggest that the interchange and Tudor Road (although carrying more vehicles) would still suffer from congested conditions. The draw of traffic to Muldoon Road would cause traffic congestion there. If such a grade-separated solution is pursued, it should be in combination with other improvements that help to spread the traffic to other routes.

- The East City Bypass route splits traffic coming in from Eagle River and beyond, but does little to satisfy traffic demand between housing and employment within the study area. The far east end of the bypass draws few trips from the Muldoon area. The route picks up considerable traffic after it reaches the connection to Boniface Parkway. The model run is consistent with origin-destination data completed for the study, which suggests removing true "bypass" traffic is not significant enough to have a major effect on the core congestion areas at the employment centers.

- The more north toward Tudor Road that the bypass routes traverse, the more traffic they draw. The model runs suggest that traffic on the East City Bypass is not truly bypassing Anchorage, but is bypassing Tudor Road to get to destinations such as the University-Medical District, Midtown, and the Ted Stevens Anchorage International Airport.

- Boniface Parkway-Dowling Road expressway combinations drew considerable traffic, and these model runs suggest that this cross-town route is in high demand. The high demand threatens to overload the capacity of the existing stretches of Dowling Road and Boniface Parkway with the connection, indicating that additional capacity could be needed if that route moved forward.

- Routes parallel to Tudor, particularly with limited access or expressway type design, will draw traffic from Tudor Road.

- Despite the higher capacity available on Boniface Parkway, bypasses of Tudor Road connected to Boniface Parkway could cause congestion problems there without added capacity or improvements elsewhere in the system.

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